

The **TOOL ENGINEER**

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FEBRUARY
1938

Official Publication of the
**AMERICAN SOCIETY
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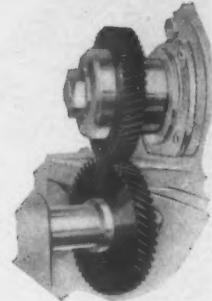
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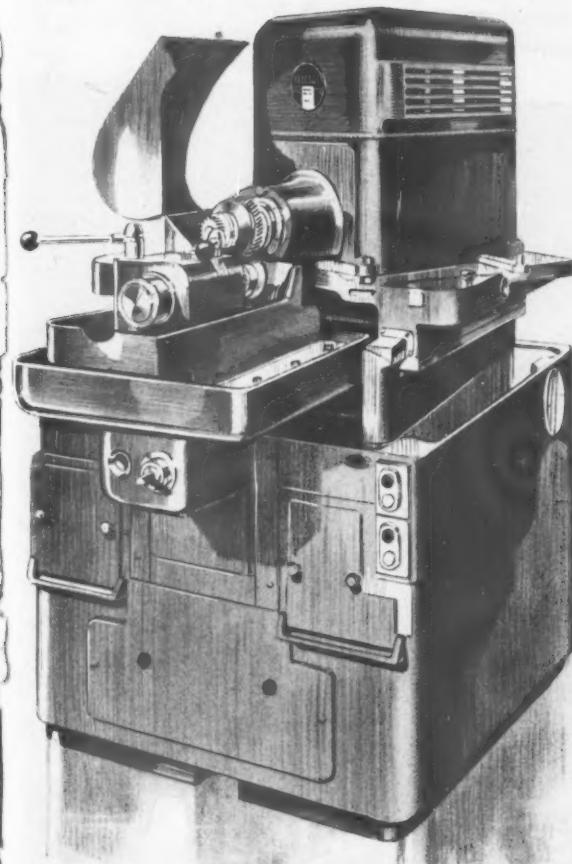
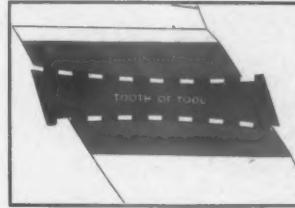
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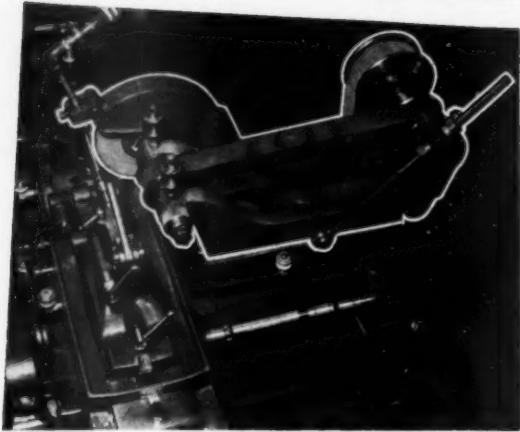
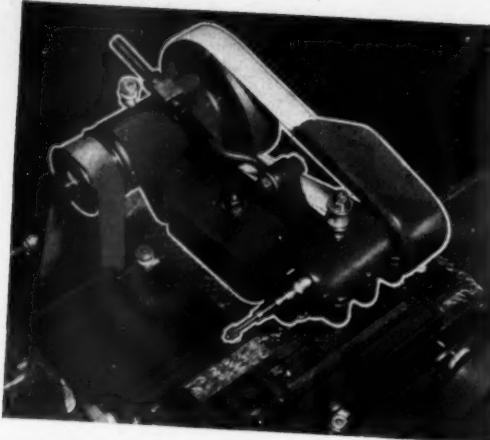
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No. 10

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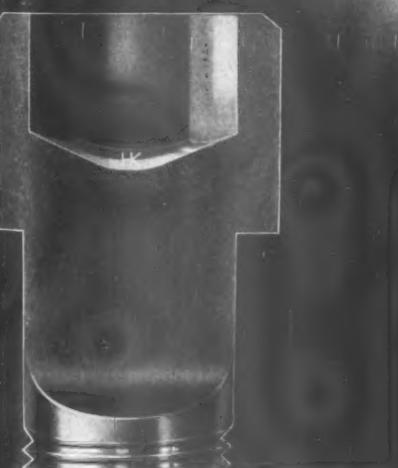
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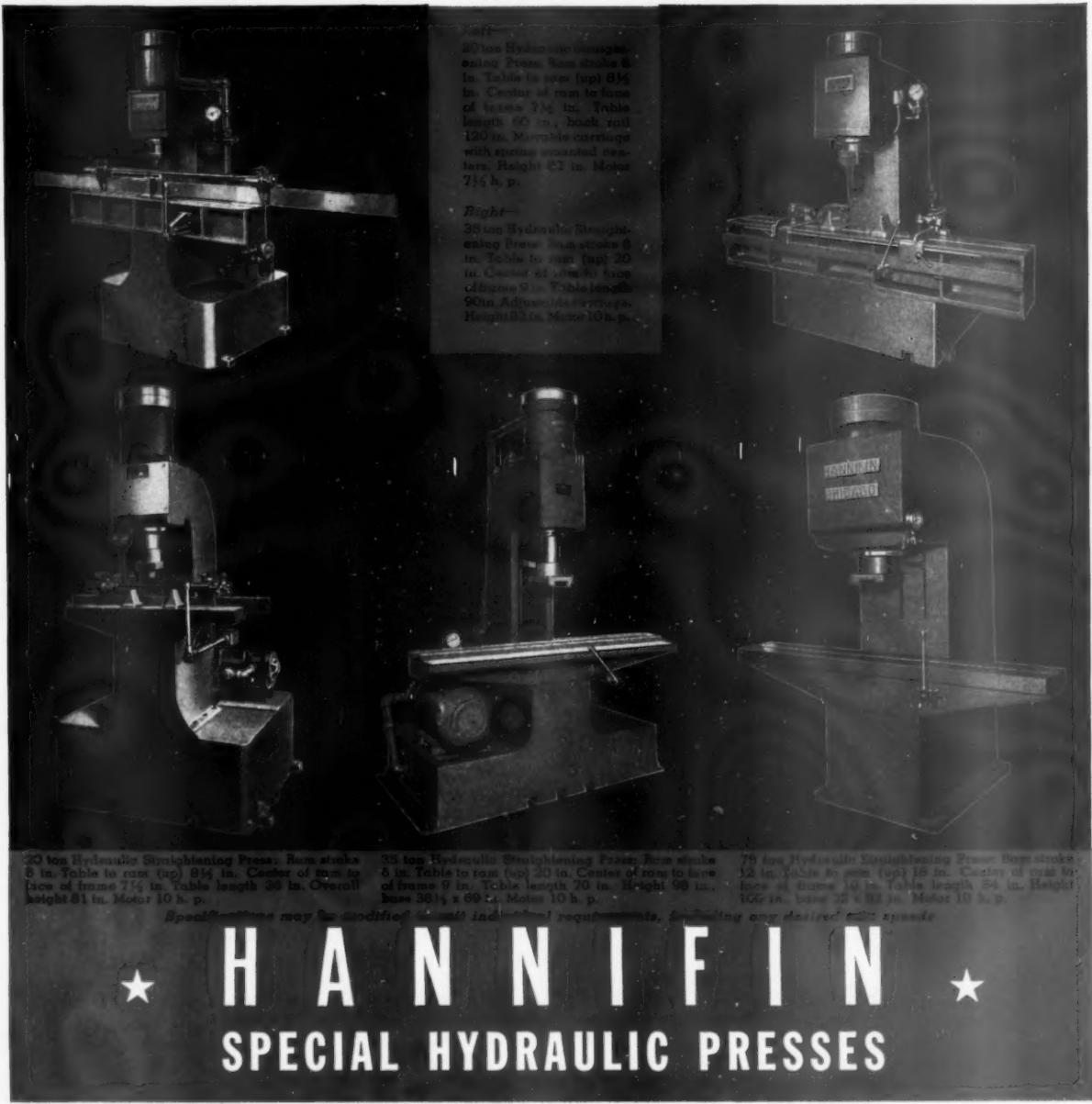
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EDITORIALS

By

A. E. Rylander

Optimism Preferred

IT is gratifying, when one champions a program of progress — as "The Tool Engineer" has consistently done — that one's optimism is justified by the turn of events. One feels, then, that the written word is something more than a mirror of conditions; it shapes them as well. We have said that this "recession" is temporary, that an underlying soundness of the nation presages good times ahead. Because it has faith in that premise, the American Society of Tool Engineers now launches a mammoth Tool and Machine show to expedite progress; it gambles on its belief in the ultimate rightness of things. Let us see what the omens augur.

As a beacon in the murk of recession comes Roger Babson's prediction of improved business conditions for '38; that prediction is supported by a slow but marked rise in the stock market, by the reemployment of thousands of steel workers. Then, Ford is going ahead with a tremendous expansion program, entailing huge expenditures for new equipment; right on his heels, the du Pont interests come through with a \$35,000,000 expansion plan, while Hudson Motors launches a new car, doubles its force. North, East, West, South, industries large and small join in the March of Progress; as usual, industry leads the way.

But, we cannot leave it all to the industrialists, financially powerful but numerically weak. The Tool Engineers — ALL engineers — are definitely committed to the proposition that prosperity shall prevail. But to insure a bright future, we must help to shape it. Optimism preferred, we must yet help to dissipate a fog of pessimism that obscures the road. We know that business is made jittery by the uncompromising attitude of the Administration, there are unreasonably high taxes to be reduced, labor agitation to be allayed, political muddling to be resolved; there is a doubt as to whether Congress will stand pat on a policy of interference or definitely commit itself to cooperation with business. Well, let us see that we get such cooperation; let every Tool Engineer align himself with the Forces of Progress. WRITE OR WIRE YOUR CONGRESSMEN, YOUR SENATORS, jolt them to a realization that we want immediate and definite results. Sell them stock in Optimism Preferred.

Industrialists or Politicians—Which?

WITH industry geared for action, but the wheels temporarily idling, New Deal proponents suggest that the recession can be stopped if business and the government get together. That presumes compromise, an adjustment of differences. However, the New Deal government has not been inclined to compromise, rather, in meddling and attempted regimentation, in imposing of oppressive taxation and in fostering industrial discord, has persistently reared the most stubborn barriers to industrial progress. One may infer, then, that "getting together" implies the running of business according to the concepts of political bureaucrats who, judged by the hectic events of the past few years, would commit business and industry to policies that, instead of promoting employment and prosperity, would defer recovery. For after all, we are not yet recovered from '29; the "recession" is not another depression but a temporary check to recovery. And, in passing, we are reminded that recovery did not begin until the Supreme Court had invalidated the NRA, with its strangling grip on industry.

New Deal spokesmen — as the Messrs. Ickes and Jackson — imply a combine by business and industry, presumably to force moderation of government interference, the reduction of taxes and to negate the influence of the C.I.O., all of which, by the way, have been contributory causes of the recession. Conceding the implication, for the sake of argument (although it has been logically refuted alike by industrial leaders and Homer Martin of the U.A.W.), the cold fact remains that when the wheels of industry slowed employment dropped. To whom, now, do we look to create employment? The C.I.O.? Obviously not. The government, then? But the government can only employ the idle by taxing the employed and the employers, and when the latter are overtaxed there is less money for expansion and the spread of employment. Contrasted to private enterprise, government projects pay negligible if any dividends, hence, the government cannot perpetuate employment, is limited in scope by the amount it can tax the people. Where is the limit? Apparently we have reached it; the recession is not a "sitdown strike" by industry, as imputed, but a general strike against rising costs. Costs and income must be balanced if prosperity is to be assured.

Criticism is futile unless constructive; it is constructive when warranted by the facts and when supplemented with workable alternatives. The writer does not impugn the good intentions of the New Dealers, nor does he disparage the government in comparison with other governments. Taxes are doubtless necessary and inevitable since no government seems to be able to operate without them; there is, however, a sharp demarcation between the functions of government and the running of private enterprises within it. A wise government encourages industry, fosters its resources.

There is also the vital consideration of whether or not political bureaucrats are qualified, by experience and training, to dictate the running of industry. How many of the New Dealers now seeking to regulate business have ever engaged in industry, or promoted it, or directly earned a dollar from it, except as possible stockholders? But almost without exception the leaders of industry have stepped up from the ranks; they have begrimed their hands with toil, have invented, created, planned, have won promotion by the coordination of hands and brains. They know industry from the ground up, have helped to build it from the ground up. Which of the two types — industrialist or politician — by logical reasoning is the qualified arbiter of the problems of industry? The question answers itself.

The prime consideration is that we cannot have prosperity unless we have mass employment, without which we cannot have a mass market. But mass employment depends on several things; there must be money — Capital — to develop new ideas and to foster research, to build factories and to equip them with machinery and tools. That presumes profits, else Capital will not be tempted to invest. Now, if Capital (which means small as well as big investors) made a practice of withdrawing its profits there would be cause for government regulation, might even be excuse for regimentation. But that has not been the case. Rather, the history of every major industry has been one of growth from a small beginning. Patently, then, Capital (and I detest that term for a necessary commodity) reinvests, provides more employment, with the collaboration of labor promotes prosperity and the wealth of the nation. Can government foster industry by curtailing its resources, by discouraging expansion? Truly the recession can be stopped if business and the government get together, but cooperation implies something that works both ways. Let the politicians ponder that.

To prosper, an industry must be self sustaining, must show a profit over costs, else it would eventually go bankrupt. Unlike the government, it cannot tax to balance deficits, it can only borrow and only then on known assets or innate character. Only as long as an industry is self sustaining can it promote employment. It ceases to be self sustaining when production costs exceed income, definitely ceases to progress when it cannot move its goods. Then it retrenches or liquidates. An idle industry does not employ.

When an industry cannot move its goods it presumes (1) that its product is inferior to competitive commodities, or (2) that costs in general are too high throughout industry. Since we have a general "recession," but fortunately confined to America, we may assume the second condition. Why? Because the C.I.O., a government favored monopoly of labor, has entirely neglected to educate the workers among the industries it has organized to the fundamental of industrial economics that high wages must be offset by reduced unit costs. Until that fact, along with a few others, is impressed on the workers all the high wages in the world will not create mass prosperity.

If a crew of men, making automobiles, gets a 100% raise but cooperate with management to produce twice as many cars, that is a definite raise because it comes back in cheaper automobiles. And if it goes all around the line, so that all workers so cooperate, then the automobile worker gets his radio and washing machine that much cheaper. But if the cost of production doubles, well, then we have what we've got — a recession largely caused by a buyers' strike. It's as simple as all that.

The case presented, the whole thing can be resolved by cooperation between the various factions concerned; such a concord, however, must consider the general public. The automobile workers do not absorb all the cars, any more than miners use all the coal nor farmers eat all the food; it takes 130,000,000 people, in round numbers, to make up the mass market for America alone.

This much is indisputable, that we should be on the upgrade after the depression but that we are definitely in a recession, that the only way out is to put the masses of the people into gainful employment. And, since industry is the only agency, outside of the limited requirements of agriculture, that can promote employment the logical conclusion is to level all barriers that impede industrial progress and expansion. All the regulation, all the cooperation that industry needs is to be let reasonably alone. Let that lesson sink in.

Millions for Re-Tooling Provide Favorable Background for A.S.T.E. Tool Show

MANY factors combine to provide a most favorable background for the American Society of Tool Engineers Machine and Tool Progress Exhibition to be held in Detroit, March 9-12. It has been timed to coincide with the peak buying season in mass production industries, for machinery, tools, production equipment and materials.

New plant equipment purchased by companies in the area around Detroit, alone, may reach the startling total of \$65,000,000 this year, if present plans are carried through, according to Ford R. Lamb, Executive Secretary of the A.S.T.E.

Plans for the show have been progressing for some time and many reservations for exhibit space have already been received, although general announcement was withheld until last month when the first general announcement was made in this publication. Many recent developments, particularly the interest and enthusiasm shown by the various A.S.T.E. Chapters in the nation's most important industrial centers, indicate that the Tool Show is already an assured success. In each of the local chapters hard-hitting committee workers are arranging special excursions to Detroit to bring their delegations of members, friends, guests, and all interested manufacturing executives to the capitol of mass production for the momentous occasion.

The Show is sponsored by the American Society of Tool Engineers in connection with its 1938 annual convention. It will represent one of the widest ranges of industrial equipment, ever assembled, including such items as abrasives, grinding equipment, air conditioning, compressed air equipment, metal removing and metal finishing machinery, tools of every variety for cutting or assembly, air or electric operated, etc. Material handling equipment, the latest in conveyors

Automotive and other mass production industries will be re-tooling during the late spring and early summer. These "programs" may easily run \$65,000,000.



Every factory executive in the country is invited to attend the A.S.T.E. Tool Show. Consult the title page of this publication for list of officers, national and local, who will be glad to give full details as to reduced transportation fares.



Frank A. Shuler, A.S.T.E. President
"Many millions will be spent by our members in 1938..."

and hoists, will be represented. In the heat-treating field, exhibits are scheduled to include furnaces, pyrometers, and automatic controls.

Plastics and plastic production equipment as well as metal spraying equipment are included in the show, as are paints, oils, and greases, and equipment for handling these materials. Other types of classifications include: alloy castings, die sections, steels and other materials, welding equipment, blowers, electrical equipment, gauges, weighing and testing equipment, chucks and collets, drafting materials and supplies, pumps, hydraulic mechanisms, riveting equipment, trim equipment, safety equipment, wrenches and hand-tools, etc.

Organized as recently as 1932, to provide a technical organization for production men responsible for the use of machines, tools, and equipment in mass production industries, the A.S.T.E. has grown by leaps and bounds, doubling its membership in each of the past two years, with 14 chapters covering almost the entire Industrial East. During 1937 alone, six new chapters organized and joined the Society, while six more are scheduled to get under way with their first meeting in the near future.

As the result of the rapid growth of the A.S.T.E. and its widening scope, embracing many industries, it was decided to hold the Society's national convention in March of this year, bringing together in Detroit hundreds of manufacturing executives, master mechanics, Tool Engineers, tool supervisors, machine, fixture, tool and die designers, etc., for a four day technical session.

With the A.S.T.E. membership largely controlling the use and purchase of equipment and materials, it was felt that recent developments in equipment and methods should

(Continued on Page 50)



Chuck Operations and Tooling for Turret and Production Lathes

By

U. S. JAMES

Gisholt Machine Company

MANUFACTURING today places a greater responsibility upon the machine tool builder for the efficient production of parts of various shapes and sizes. They present many intricate problems of chucking and handling in order that they may be machined to the closer tolerances that our present age of high speed require. This also presents many complex problems of tooling so that the parts can be produced cheaply and quickly.

New methods and equipment are continually being devised and improved in order to meet these conditions and it is the job of every manufacturer to keep informed of these new methods and to take advantage of them whenever they can be economically justified. It is likewise the duty of the machine tool builder to call to the manufacturers' attention these new developments and methods that will be good investments for them or which will increase their production and lower their costs.

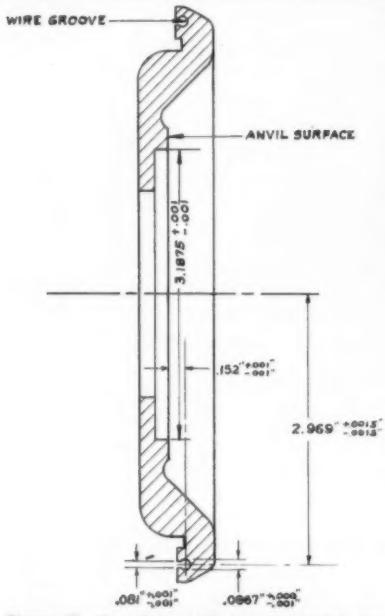


Figure II. Drawing of electric typewriter bar segment showing over-all dimensions and close tolerances.



Figure I. First operation, machining electric typewriter segment on No. 4 Gisholt Universal Turret Lathe.

In lathe work, it is not only necessary to have accurate and efficient machines but proper methods of chucking and tools that will permit the fastest multiple cutting. In many cases, this does not mean special tools but rather the proper application of standard tools and standard tool holders, as well as the selection of the various cutting materials for each job.

A good example of chucking

work and proper tooling is in the manufacture of type bar segments for electric typewriters. These parts are made from nickel cast iron and machined on a Gisholt No. 4 Ram Type Universal Turret Lathe in two operations.

Fig. I shows the first operation in which the piece, Fig. II is held in a three jaw scroll chuck with hard jaws specially formed to fit the contour of the part. A standard multiple

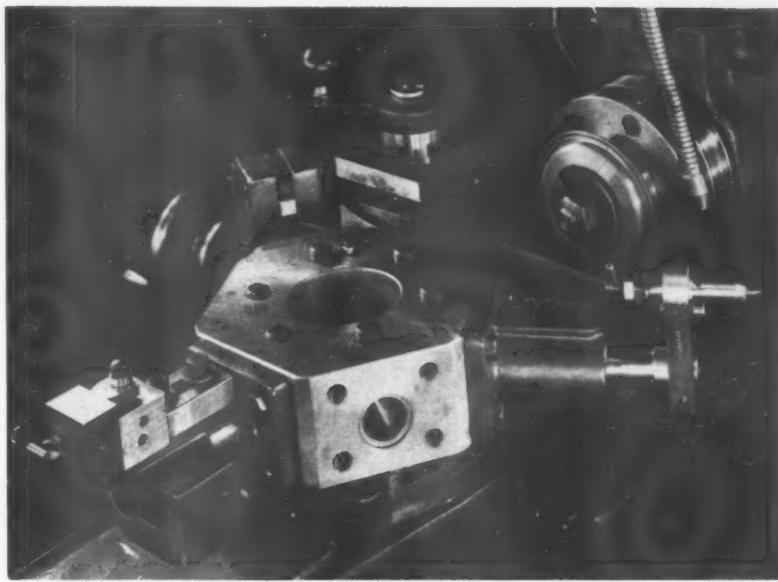


Figure III. Second operation on electric typewriter segment on No. 4 Gisholt Universal Turret Lathe.

cutter head and piloted boring bar on Face 1 of the hexagon turret holds four tools which rough all first operation surfaces simultaneously. A standard multiple cutter head on Face 3 of the turret holds two tools which finish form the irregular contour. A piloted boring bar with an adjustable boring head on Face 4 of the hexagon turret semi-finish turns the counterbore and finish faces the anvil surface. A boring bar with single point cutter on Face 5 of the hexagon turret sizes the counterbore and undercuts the cover. The dimension of the counterbore is held to 3.1875 plus .001" minus .001". The square turret tool post holds a special tool holder and cutter which is used to finish the area that will be under the clamp in the second operation. The time for this first operation is 3 minutes floor to floor.

Fig. III shows the second operation in the machining of the type bar segment. The piece is clamped on a centering plate by means of a nut and C washer. Locating is from the previously machined counter-

bore and anvil surface. The two faces are rough and finish turned with tools held in a special tool holder on the square turret tool post. A standard multiple cutter head on Face 1 of the hexagon turret holds two tools that form the radius and cut the shallow grooves. A combination flanged tool and adjustable cutter holder on Face 3 of the hexagon turret rough form the wire grooves and finish the narrow neck to dimension .081" plus .001" minus .001". The wire groove is then finished by a special eccentric tool

holder and radius forming tool held on Face 4 of the hexagon turret. The wire groove is held to a dimension of .0967" plus .000", minus .001".

Note: In this operation, it is necessary to hold close dimensions. These are the dimensions from the center of the segment to the center of the wire groove, which is 2.969", plus .001", minus .001". The other is the distance from the anvil surface to the center line of the wire groove, which is .152" plus .001", minus .001". The time for this operation is 3½ minutes.

There are two different problems in the machining of these type bar segments — that of holding the close tolerances between the surfaces machined in the first operation and those machined in the second operation. The other problem was the machining of the wire groove and holding the close tolerances required.

Another very interesting example of chucking work and proper tooling is in the manufacture of oil pump covers, Fig. IV. These parts are made from cast iron and are machined on a Gisholt No. 3 Universal Ram Type Turret Lathe, Fig. V. The parts are machined completely in one operation and one set-up.

The machining of these parts presented a very difficult problem — that of machining on two different centers and holding close tolerances, on each surface relative to the other. This was overcome by

Figure V. Gisholt No. 3 Universal Turret Lathe.

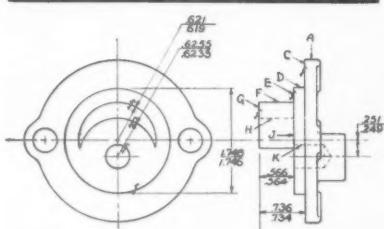
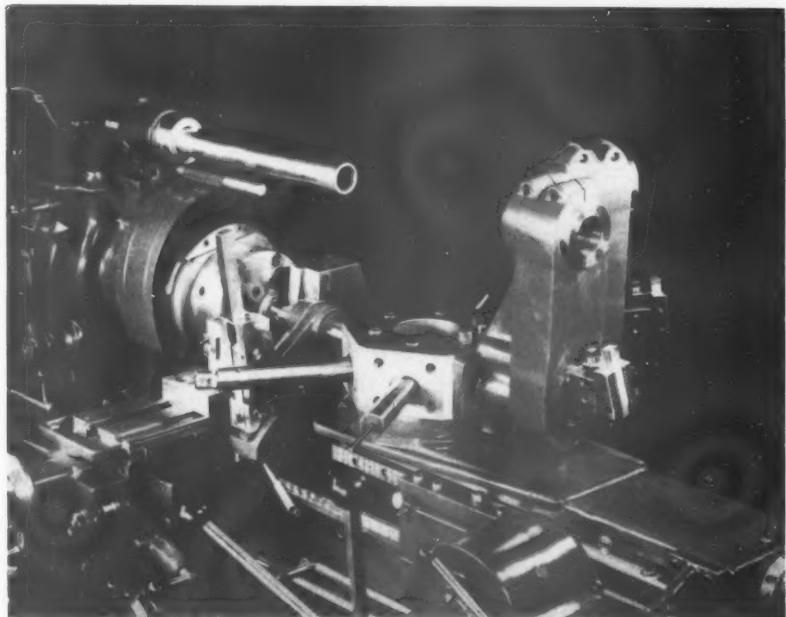


Figure IV. Machining eccentric surfaces on oil pump covers chucked by automatic air indexing fixture on Gisholt No. 3 universal.

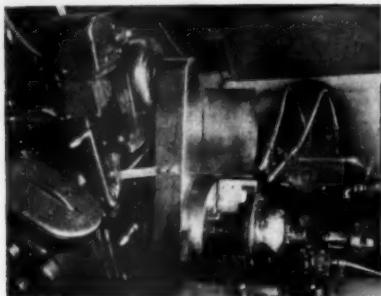


Fig. VI. 14" Fay lathe tooled for rough machining all surfaces on differential case.

mounting a standard Gisholt three jaw scroll chuck on an air operated indexing fixture so that all machining could be done from one chucking. This resulted in fast handling, as well as a very accurate job.

The oil pump covers are machined as follows: Rough face surfaces C, E, G, and rough turn D with the front tool block. At the same time turn F with a tool in the overhead piloted turning head and fin-

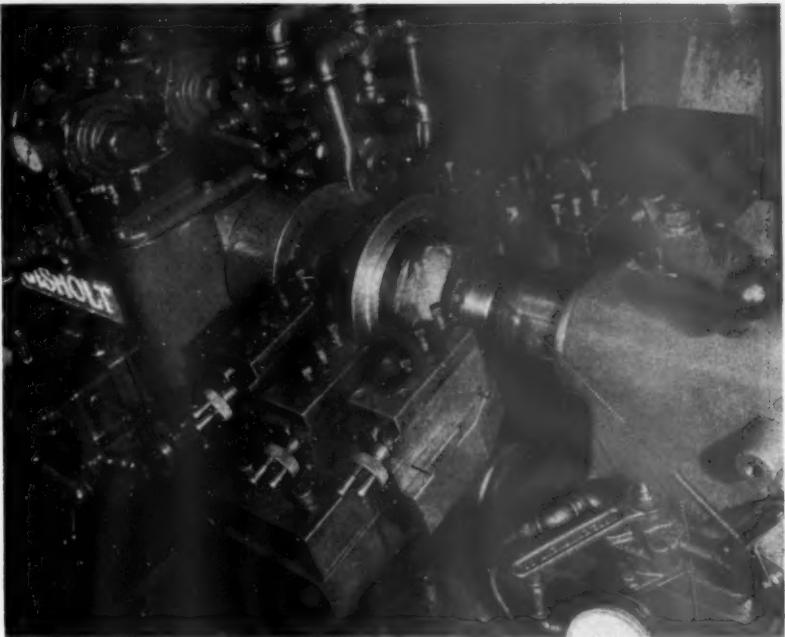


Figure VIII. Final finish machining of differential case on drive gear and bearing diameters on 12" Gisholt hydraulic production lathe.

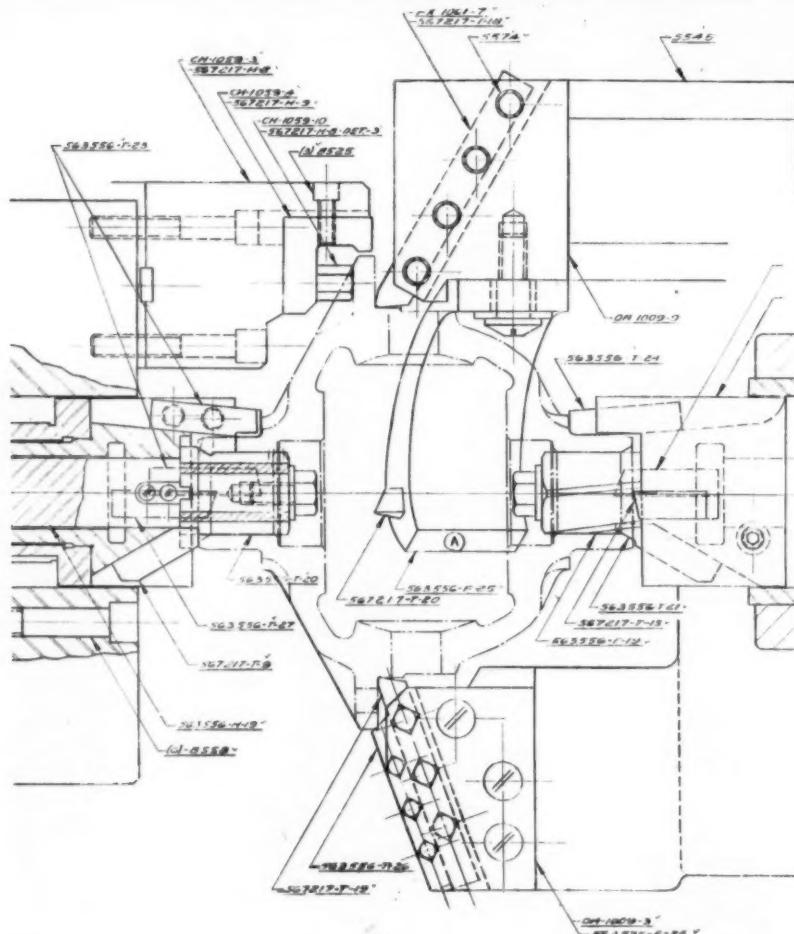


Figure VII. Tool layout for rough machining differential case.

ish face C, E, and G with a forming tool in the rear tool holder, finish turn F .621/.619 with the second turning head. The chuck is then indexed to the new center without stopping the spindle and the cam locking drill support mounted on the side carriage is swung in place and the following centering, drilling, boring, and reaming operations are guided in this support. The next operations are: Center with a center drill, rough drill eccentric hole, and rough bore H and J and drill K. Semi-finish ream K .373/.372" and finish H .6255/.6235", and finish ream K. The time is 2 minutes floor to floor for complete machining of these oil pump covers.

Another interesting job is the machining of malleable iron differential cases on a 14" Fay and a Gisholt No. 12 Hydraulic Automatic Production Lathe. Two different sizes, large diameter $10\frac{1}{4}$ ", small $9\frac{5}{16}$ ", of differential cases are machined on these machines which are arranged so that they can be changed over for machining either size easily.

Fig. VI shows the first operation on a 14" Fay lathe which consists of chucking on the O.D. of flange with a three jawed Horton Electric Chuck. Fig. VII shows the arrangement of the tooling, the cat heads on tailstock and back boring attachment, bore hole in hubs, rough turn O.D. of hubs, face ends to overall length, chamfer O.D. and rough

center bore and face shoulder to rough overall dimension.

Front slide rough turns O.D. of ring gear diameter and chamfers flange.

Rear slide rough faces flange and by means of auxiliary tool A flange ring diameter is undercut. Floor to floor time is 1.5 and 1.9 minutes respectively, cutting speed 475 feet with .012 feed, using Carboloy tools.

Operation 2, re-center bores in drill press.

Operation 3, Fig. VIII, the differential case is held between centers on a 12" Gisholt Hydraulic Lathe and driven by an air operated draw rod and "C" washer that holds the carrier rigidly to the headstock center. The outer end of the piece is supported by an air operated tailstock center. This method of chucking permits finish machining operations on all exterior surfaces including the hubs.

All machining operations are done in this one chucking, the front slide holds three tool blocks that are used for finish turning both hubs, to a tolerance of .001" and the ring diameters to a tolerance of .003". Simultaneously three tools on the rear slide finish face and chamfer the ring gear seats and finish form and face to length both hubs. All tools used are Carboloy tipped. The feed for the front tools is approximately .004" per revolution and the feed for the rear tools is approximately .003" per revolution. The maximum surface speed is 500 ft. per minute. The floor to floor time for the small size case is 1.25 minutes each; for the large size 1.4 minutes each.

Tolerance: Lateral runout and eccentricity on drive gear seat not to exceed .002 total indicator reading when supported by hubs. By actual test lateral runout and eccentricity does not exceed .0004 due to rigidity and accuracy of equipment also high quality of finish obtained has made possible the elimination of all grinding operations.

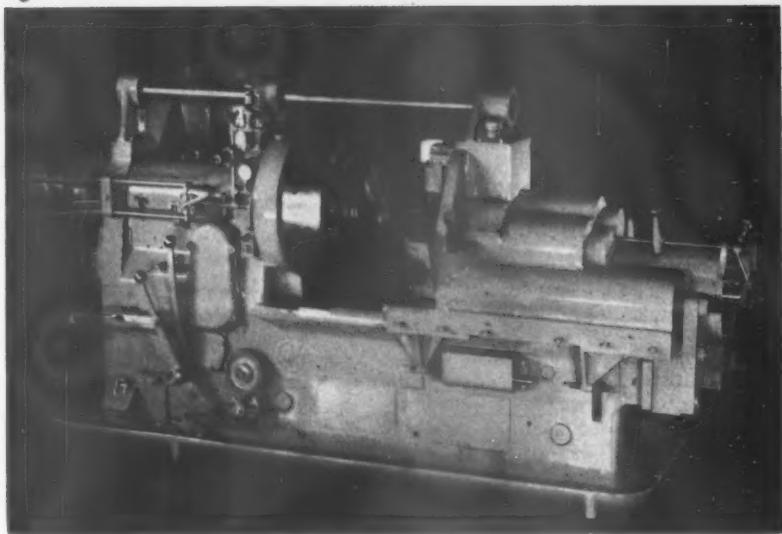


Fig. IX. Gisholt 3D Radial Fly Wheel Machine.

centricity on drive gear seat not to exceed .002 total indicator reading when supported by hubs. By actual test lateral runout and eccentricity does not exceed .0004 due to rigidity and accuracy of equipment also high quality of finish obtained has made possible the elimination of all grinding operations.

Another very interesting chucking operation is that of the manufacture of cast iron flywheels for automobiles. These flywheels are machined on Gisholt Radial Type Simplimatics, Fig. IX, in which they are machined in two operations, one operation being performed on one machine and the second operation on another similar machine.

Fig. X shows the tool set-up for machining the first operation. In this operation, the clutch side of the flywheel is roughed and finish machined. The rough flywheel castings are held in a 24" three jaw air chuck with hard jaws. Nineteen tungsten carbide tipped tools are held in three tool blocks arranged in a radial position to the work. The front tool slide, which contains five tools, rough faces the clutch surface and finish forms the oil slinger groove. The six tools in the rear slide complete the roughing of the clutch surface and finish shave the outside diameter. The center slide with piloted boring bars and eight tools rough turn the outside diameter, bore the center hole, shave all surfaces, and chamfers corners.

Fig. XI shows the tool arrangement for the second operation. In this operation the crank side of the flywheel is roughed and finished. The flywheel is here chucked on a

finished surface on the outside diameter in a 24" three jaw air operated chuck with wide jaws. Nineteen Carbide tipped tools are held in three tool blocks arranged in a similar radial position to the work.

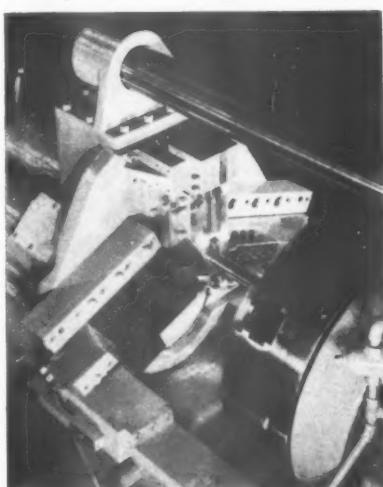
The front slide, which contains six tools, partially rough faces the crankshaft side of the wheel and rough turns ring gear diameter. The rear slide completes the rough facing operation with six tools. The center slide and piloted boring bar finish bores and chamfers center hole, shaves three surfaces, finish turns ring gear diameter, and chamfers corners.

The time for both operations is 1 1/2 minutes each.

The tooling arrangement was designed to permit the maximum num-

(Continued on Page 38)

Figure X. Close-up of first operation flywheel tooling, showing 19 tungsten-carbide tools machining clutch side of wheel in 1 1/2 minutes, floor to floor.



MODERN TIME STUDY

(Conclusion)

BW

E. W. Shumard

Founder, National School of Time Study,
Norwalk, Connecticut

No direct labor operation is immune from time study. Even for the products cost the most, direct labor charges are the lowest, and each indirect job. In most metal working plants the materials used are the ones considered as insignificant should be analyzed, standardized, timed and rated, so that cost statements can have indices of comparison with actual performance. Indirect operations should also be standardized and indices set up for indirect charges next to the highest. Since direct labor is low and indirect labor is higher, why should this fertile field of overhead expense escape analysis?

The usual overhead rate is a nebulous thing. It embraces all expenses after prime costs. A general overhead rate covers salaries and wages paid to foremen and other indirect key men; light, heat and power; taxes and rent; insurance on raw, semi-finished and completed materials and plant contents; repairs; depreciation; supplies; administrative expenses. Some of these items are not fixed charges, but are estimates the accountant must set up until the yearly closing of the company's books offer definite figures to prove or disprove the estimated phases of burden rates.

Use Two Overhead Rates

In so far as a manufacturing department is concerned, there should be two separate overhead rates used; one for the foreman which relates only to those departmental issues that are within his own control. The other rate is known as the general overhead burden rate later applied by the accountant. By doing this, the foreman has a factory departmental overhead rate subject to his own control and for which he can be held strictly accountable. Otherwise, he has a legitimate right to challenge any reproofs management may offer as to the foreman's increasing overhead charges based upon but one general burden rate. It may be that the overhead charges are higher because the front office hired some more typists and clerks of whom the foreman knows nothing. If so, he should not be hopped on for expenses outside of his department.

However, if the foreman is given

a factory overhead rate applicable to his own department, he can be held responsible for fluctuating costs. That rate covers every so-called indirect worker ranging from a full or part time janitor to the foreman himself.

The factory burden rate referred to is determined by finding out, through time study, just how many indirect hours are necessary for a given volume of production. To this end, the time study man times every indirect worker in the department—the foreman included—and arrives at a time index for each. Since so much time is allowed to direct operators to complete their work, likewise a time index should be set up for every indirect task and ratios established for the two. Then, when sales volume changes, necessitating more or less personnel members, management has a definite yardstick of control in prescribing the number of men in a department.

In the last issue, I said something about batting averages, which I will amplify. If accurate standards are built for direct operators, a standard time can be prescribed for a given amount of anticipated output per day. If the operators take longer than the standard times allowed, their efforts are negative. If shorter, the efforts are positive. Therefore, standard and actual times lend themselves to a simple formula which yields an operator's batting average for the day. By multiplying the various pieces of work completed per day by their respective standards, a product is obtained which can be considered as the total expended, manual energy values. Dividing that product by the number of hours during which the work was done, results in a quotient. That quotient is the batting average. Or, in Bedaux language—a Point Hour

Bedaux Says—

Bedaux says that the ideal manufacturing goal is an 80 Point Hour. It means that if an operator is given an attractive wage incentive, he will

produce 80 minutes of work per hour. Some will produce more than 80, but higher performances will be offset by others who do not equal that index. Thus, ideal, anticipated output per day from all direct labor in a department or plant is an 80 Point Hour average. It is a speed of effectiveness not injurious to materials, machinery, men. Here then, is the first step in cost control—a significant, symbolic energy factor which readily tells each day just how productive the direct labor is.

The next step in cost control is to learn just how efficient is the department as a whole. The formula for this is the same as just given, with the exception, that to the operator hours on standard—in the denominator of the equation—is added any checkout times, or other operator credits granted to them because of delays and conditions beyond their control. It becomes readily apparent that if the indirect workers can prevent extraneous hours, the average Point Hours for the direct operators and the department Point Hour will be the same. Consequently, if we speak of a department as being "80-80," no voluminous reports, charts or curves need support the contention that both operator performance and conditions incidental to them are at high efficiencies—once the Bedaux measurement principle is understood.

In order to properly service a given volume of production, a sufficient number of indirect hours must be allowed. That service varies in proportion to the direct hours required; in busy seasons the indirect personnel should be increased, and cut down during the slack season. Regarding the latter, some management officials, when shipments are at low ebb, work themselves up into a real or synthetic rage, storm out into the plant and demand that everyone be fired. Afterward, some compromise is reached whereby the alleged proper number of men is kept on.

The third factor of cost control is to apply the direct, versus indirect ratios previously mentioned, to the manufacturing departments. This third factor is also a point hour and measures the effectiveness of supervision. If the foreman uses too many indirects to service a given volume of production, his Super-

vision Point Hour will be low. The time study man gives him a yard stick in the form of indirect labor ratios so that the foreman can accurately determine the correct number of indirect workers required for varying production schedules.

Cryptic Symbols

As manager of an organization, were I to phone long distance to the plant and ask the status of it, and the reply came back that it was "80-80-80," I would perhaps stay on for another week in Atlantic City or Asheville. However, if the reply was "65-60-50," these short, cryptic symbols would impel me to take the next plane home.

Modern time study provides these symbols or their equivalent. A low cost when once obtained, should be held at that level. Therefore, a prime essential in manufacturing is cost control. Any fluctuations likely to occur should be anticipated before their occurrence and prevented. In order to do this, the methods used should be highly sensitive to the daily or hourly trends. Protect beforehand the horse by vigilance or locking the barn door—don't wait until it is stolen! What good is a long typewritten report ponderously explaining why the last quantity of machines was shipped at a loss. The right kind of a report is one which clearly shows each day the status of the cost of manufacture; it will warn the executive of unfavorable trends, or cause him to give vent to chuckles of satisfaction when all is well.

Other Advantages of a Time Study

A properly made time study should not be used solely to arrive at piece work prices and then be filed away to accumulate dust. Instead, it offers other salient data which should be closely woven into the warp and filler of the industrial fabric to establish the best pattern obtainable.

As members of the American Society of Tool Engineers, you should have more than a passing interest in modern time study procedure, because in many instances, tool design and time study are interfused. As tool designers you keep constantly in mind the shortest production path consistent with best practices under given circumstances. This path involves balanced manufacturing operations under desired working conditions to cut down effort and time lost in handling suc-

cessive pieces of work. The time study man also tries to follow that same path and he should know a lot about tool design. Some do, whereas others merely recognize good and poor tool design when they see it. Rather than discuss the good and bad features of tool designing he encounters, let me take the few remaining moments to briefly outline some of the points of good tool design the time study man recognizes in his analysis of operations.

In the punch press department, the time study man likes to see the use of die sets containing pillar posts or guide pins, because the punch and die members are kept in alignment. Die sets not only facilitate set ups, but prevent damage when press equipment is in storage. As to punch and die construction, he likes to see the use of follow-dies where the metal is punched or shaped in progressive stations and particularly where the last station allows the finished piece of work to drop down through the die into a box or container.

He hates to see the type of punch and die used where the operator must reach under the press ram, pick off the work with a stick or his fingers, and then throw the finished work into a barrel. He hates to see anything that may cause the press operator to lose fingers. Good punch and die design, besides allowing for fool-proof operation, quick set ups and ease of die section replacements, also recognizes the accident hazards which can be high in press departments unless safety measures are continually observed. Air jets, inclinable presses and knockout pins to remove work from dies are a few of the items to be incorporated in good press equipment if the completed work cannot drop by gravity under the press.

Although there is little he can do about it, the time study man would rather see machine feeds and speeds regulated by pick-off gears, than by quick change tumbler gears and hydraulic feeds. Or, if quick change gear boxes or hydraulic means are built into the machines, some type of lock should be installed whereby the selected inches of cutting speed per minute can be confined to the feeds and speeds found to be most satisfactory per operation. Otherwise, no matter what so-called maximum feeds and speeds may be prescribed, the operator can, by flipping one or more levers, increase the cutting action. This he does some-

times and it often results in burnt or prematurely dulled tools and consequent poor work quality. That same operator will quickly change his cutting action back to specifications upon the approach of the time study man and contend, ironically enough, that the cutting action demanded by the time study is too severe.

Jigs and Fixtures

As to jigs and fixtures, the time study man likes to see designs that are not too heavy or light in all sections; ones that are foolproof in operation; bedding points that can be rapidly cleaned; adequate chip clearances; clamps which quickly bind the work firmly, without distortion; ease of putting in and removing work; and scores of other items which will allow fast, rhythmic operator performance.

Clamps, whether fastened by screws, cams or air should be located in positions that will not cause awkward operator postures. These clamps should be arranged, if possible, to require both hands being used simultaneously—one hand per clamp. This synchronous employment of the hands permits of operator rhythm.

I should be more specific in that statement. Let's assume a box-type jig; one with a leaf which swings out of the way for work removal; and two or more binding clamps. If the work is small, one hand picks it up and places it in the jig and at the same time the other hand reaches for the leaf to swing it into position. Both hands become individually and equally busy in manipulating the clamps. The left hand should be completing the clamping cycle just as the right hand is bringing down the drill spindle to the work.

In my few remaining moments, I would like to tell you of a few things in the way of tool design the time study man would be glad to see more of—especially applied to bench operations. One usually thinks of a bench containing a conventional vise and a lot of miscellaneous tools scattered over the bench top. Usually, that equipment suffices, but in today's competitive practices, perhaps it won't do for some jobs.

The Time Study Man Favors Energy-Saving Devices

The time study man would like to see more air-operated equipment
(Continued on Page 40)

PRODUCTION PERSPECTIVES

News of Mass Manufacturing from Everywhere

Mid-West

The announcement of Hudson Motor Car Company's new model was cheering news in many quarters. Among them the labor unions. Homer Martin, president of the U.A.W., commented, "It is a welcome relief in the monotonous pessimism to hear of one who plans to go forward; one who announces a rehiring of workers rather than a mass layoff." The news of the new model was "good news" to a number of Cleveland manufacturers of automobile parts of whom Hudson is a customer. In addition to orders placed in Detroit shops and plants, the Hudson Company is currently taking steel from the Cleveland plants of the Republic Steel Corporation, valves from Thompson Products, cap screws and bolts from Ferry Cap & Set Screw, machine products from the Weatherhead Company, and gears from the Ohio Machine & Forge Company. Other suppliers in Cleveland are the Eaton Manufacturing Company, and the Upson Works of Republic Steel. Hudson also buys a quantity of rubber products and tires in Akron and bearings and alloy steels in the Canton and Massillon district. From time to time the company is a customer of Cleveland machine tool builders as well.

The Auto-Diesel Piston Ring Company of Cleveland closed 1937 with an increase of 52 per cent above 1936's business it was reported by R. D. Smith, general manager. Considerable business is already booked for 1938, Mr. Smith said. The plant has grown steadily since 1929, with successive increases every year of from 16 to 64 per cent. Floor space and plant facilities for this company were doubled in April 1937.

A 50 per cent increase in production to meet the demand for Columbia "over drive" axles for the 1938 Lincoln Zephyr and Ford V-8 cars has been made by the Columbia Axle Company in Cleveland, according to N. S. Lincoln, executive of the company. "Motorists have become 'over drive' conscious," Mr. Lincoln stated, "and answering this demand, ten makes of cars for 1938 are offering this feature in one form or another as optional equipment. The driver has positive control of the unit at all times, being able to use it or lock it out at any speed at



Vernon E. Walters, recently made factory manager of the Kent-Owens Machine Company, Toledo, Ohio.

will. No free wheeling is involved and the rotating speed of all driving parts to the rear axle is reduced."

Sales of electric vacuum cleaners reached a new record high in 1937, according to C. G. Frantz, secretary of the Vacuum Cleaner Manufacturers' Association. Replacements and expansion in the larger centers and rural household purchases in direct proportion to the spread of electrification will give the industry even greater sales volume in 1938, Mr. Frantz predicted.

From Toledo we hear that Vernon E. Walters has recently joined the staff of Kent-Owens Machine Company as Factory Manager. Mr. Walters comes to Kent-Owens from the Inland Manufacturing Division of General Motors at Dayton, where he was Master Mechanic. For the past eighteen years Mr. Walters has been allied with the automotive industry, serving both General Motors and Chrysler Corporations. Prior to that he was engaged in the manufacture of fire arms with the Savage Arms Company and the Ross Rifle Company.

At Pittsburgh, Roy A. Hunt, president of Aluminum Company of America, outlined what his company is doing to keep up production in its plants despite falling off of de-

mand for aluminum products. He said, "Frank statements of policy by industry can have a most beneficial effect on the welfare of the country and much good can result if American industry and government will today make known their intentions in the fight against the present recession. Speaking for our company, despite a falling off in orders in the past three months of more than 60 per cent, the Aluminum Company of America has not curtailed its production of ingot. The company is doing its part by maintaining a steady program of production . . . even though . . . there is a dearth of orders from its thousands of customers . . . maintaining production greatly in excess of shipments. This policy results in a steady influence on employment in the communities where these plants are located."

From Chicago we hear that the Mall Tool Company has purchased the assets, manufacturing plant, and equipment of Wappat Incorporated, Pittsburgh. The entire line of Wappat portable tools including saws, grinders, and drills will be manufactured and sold by the Mall Tool Company and the already established Wappat and Mall Tool Company jobbers and distributors.

Effective the first of the year, the George O. Desautels Company, 334 Postal Station Building, Indianapolis, and 114 East Washington Street, Muncie, are the sales agents of Eclipse Counterbore Company of Detroit.

The Board of Directors of Dumore Company, Racine, Wisconsin, has named Robert L. Hamilton, sales manager of the company, effective January 1. In his new capacity Mr. Hamilton will fill the vacancy caused by the resignation of Leland B. Augustine, who has been sales manager for several years past. Mr. Augustine will take personal charge of Dumore sales in the Chicago territory.

East

Announcement of the purchase of the lathe division of Porter-Cable Machine Company of Syracuse, by the W. C. Lipe, Inc., of Syracuse, was recently made by H. Follette Hodgkins, head of the Lipe interests. The new ownership is continuing the production of the entire Porter-Cable lines, without specifica-

(Continued on Page 42)

CHAPTER DOINGS

BALTIMORE

J. J. Buckley, Publicity Chairman
5303 Elsrode Avenue, Baltimore

Movies of the New Giant Martin Ocean Transport, recently completed in Baltimore, were featured as part of the double-barreled program for the meeting of January 10, 1938.

The guest speaker of the evening was Mr. E. M. Reiniger of the Cincinnati Milling Machine Company and Cincinnati Grinders, Inc., who explained many interesting phases of "Centerless Grinding."

The latter part of the meeting was devoted to the movies of the giant, 48 passenger Martin Ocean Transport. Mr. Buckley gave a short introduction by reviewing events in the history of aviation leading up to the present accomplishments of one of our greatest pioneers, Mr. Glenn L. Martin, in the development of "over-ocean" airliners. The movies covered various operations during construction, launching and the first test flight.

An excellent example of the modern tooling methods employed was clearly displayed by the manner in which a huge tractor crane easily hoisted the outer wing, extending 54 feet, in place while workmen on scaffolds high above the ground inserted the four hinge pins into the mating fittings that join the center and outer wings.

All major attaching fittings had been closely jigged in their respective assembly fixtures and solidly bolted in place.

Attracting great interest also, were the huge sea wings which are attached to each side of the hull forming a span of 38 feet. Not only do they serve as fuel tanks, having a capacity of 4260 gallons, but, also serve as wings in the air and greatly facilitate handling of the Giant Seaplane on the water, especially in negotiating turns.

Mr. Francis D. Bowman, Advertising Manager for the Carborundum Company, will present movies of the manufacture and use of Carborundum products at the regular monthly meeting February 14, 1938. He is nationally known for his excellent radio program sponsored by the Carborundum Company.

BRIDGEPORT

E. H. Ebelhare, Chapter Publicity Chairman
323 Trumbull Avenue, Nichols, Conn.
Bridgeport Chapter held its Janu-

ary meeting at 8:00 P.M., January 13, 1938, in the Barnum Hotel. Directly after the Chapter's business meeting, Mr. A. Wahl introduced Mr. L. J. St. Clair, District Manager from Newark, New Jersey Office of the Carboly Company, Inc., as guest speaker whose subject was Carboly — "Its Use, Grinding, and Method of Fastening to Other Metals." Mr. St. Clair gave an interesting and comprehensive talk, well illustrated with self-explanatory slides. The main points of his talk embodied the Design of the Carboly tips, the Brazing of the tips to the shanks of tools, and the Grinding of Carboly tools.

Among the many points brought out in Mr. St. Clair's discussion were, that the Carboly tip approaches the diamond in hardness, its unusual resistance to wear, the fact that this metal has the highest compressive strength of any known metal and that Carboly has very little elasticity and, therefore, will break if bent. The design and application of tools must therefore be such as to prevent bending. This necessarily means that the shank must support the tip without bending and that the combination of the shank and tool holder support the tip directly under the cutting edge. Further detail was given to the proper angles for tip clearance, shank clearance, end cutting, lead, point radius, positive and negative back rake and top side rakes. The location of the tip on the tool is important. Consideration must be given that wear will occur on this tip and the manner it will be ground. Position of the tip must be such to insure the maximum number of grinds.

Brazing was next discussed, and among the important points Mr. St. Clair stressed were that tool shank and tip must be clean to insure best results in brazing. Carbon tetrachloride was recommended as the best agent for this use. Easy-Flo No. 3, with a brazing temperature of 1450° F., was recommended as the brazing media due to its low melting point which reduces the danger of overheating the shank. This is recommended for general shop use. Prior to cleaning the tip all scale must be removed. It is important to note that all silver solders will not braze to Carboly. Large

tips, and to insure against brazing cracks to the tip due to difference in contraction between carboly and steel shanks, are brazed with the sandwich braze.

The recommendations for grinding Carboly tools were given, and the general recommendations were noted that wheel speed should approximate 5000 R.P.M.; that the tip should not be dipped in water; that the top rake should be ground first; moderate pressure should be used; and that the tool should be kept continually moving across the wheel; always grind against the cutting edge of the tool from tip to shank; and tool should always be kept in motion.

Application of Carboly tools is furthered with these points borne in mind, that tools must be kept sharp to get longest tool life and to prevent breakage. In cutting steel the particles of carbide are removed by chips, this is relieved by using tantalum carbide or titanium carbide grades. Impacts against the tool, due to interrupted cuts or hard spots, increases greatly with increase in speed, but less rapidly with increase in feed. To insure minimum tool breakage with maximum stock removal speeds must be held reasonable.

Carboly tipped tools are very flexible, for with torch brazed tools with the Easy-Flo No. 3 brazing agent the tip can be removed or set out by heating with torch, loosening tip and removing it, or by inserting shim behind tip and allowing to cool. Broken tips may be utilized: First, if a break is clean the broken part may be replaced and brazed in position. Second, if break is not clean it is often possible to use broken pieces to make one large tool and one small tool.

Upon conclusion of his talk, Mr. St. Clair answered many questions directed to him by many members and guests of the Chapter.

BUFFALO

George J. Keller, Chapter Publicity Chairman
658 Ohio Street, Buffalo, N.Y.

Yours truly has been asked to go to bat for our worthy "Publicity Chairman," Otto Winter, who is gallivanting around the country looking at machine tools and other things of interest. He left immediately after our January meeting for some point between here and the Rocky Mountains. His exact destination I am not at liberty to divulge and I hope that he has a pleasant trip and sees a few things of interest.

Our December 13th meeting was

snowed in and the members could not get out. As you probably all know Otto is factory manager for Columbus McKinnon Chain Company, who are engaged in the manufacture of auto skid chains. On Tuesday, December 7th, Otto and his staff had a meeting at which they discussed the sudden drop in business. They figured that a good snow storm would boost their business and therefore decided to pray for snow that evening. Otto, evidently, stands in very well with nature because that night it started to snow and did not stop until Friday afternoon. No fooling, it really snowed, in fact, so hard that Otto could not get out of his home for two days and traffic,—well there just wasn't any. However, we made up for it at our meeting January 10th. We had about 70 members and guests at dinner and later on 25 or 30 more came in to see about 100 slides covering Foster Hand Screw Machines, turret lathes, platen and turret type Fastermatics, Foster Barker Chucks and special machines that are manufactured by the Foster Machine Co., Elkhart, Indiana. Mr. Harry A. Moore, General Sales Manager, Foster Machine Company gave an address and presented two reels of motion pictures covering the Fastermatic in addition to the slides. This session was very interesting and the discussion after the pictures lasted about 30 minutes. This program was made possible through the courtesy of Mr. E. B. MacDonald, District Manager, Syracuse Supply Company and one of our active members.

On February 11th we are having our first Supper Dance to be held at the Buffalo Trap and Field Club. This is your party and for your pleasure. Dress is optional, Formal or Informal. This dance has a triple significance, the celebration of our chapter's first anniversary, Thomas Edison's birthday and also Abraham Lincoln's birthday. The dance will start on Edison's birthday and finish on Lincoln's birthday. We expect to have about 150 couples attend. Dancing will start about 9:30 P.M. and supper at 12 and then dancing again until—well we'll leave it up to you.

For our regular meeting on February 14th which will be held at King Arthur's Restaurant, we will have Mr. Howard R. Mellor, Lubricating Engineer with Socony Vacuum Oil Corp. as our guest speaker. He will present a sound picture entitled "The Inside Story." This picture deals with lubrication prob-

lems and, believe it or not, he will show us some instances where excessive lubrication causes more wear than insufficient lubrication. In addition to this he will also show a miniature cracking still in operation.

Our Chapter has been running into a little hard luck. Ben Buerk, Secretary, was recently laid up with the grippe. Our Chapter Chairman, Don Reep, has been laid up since New Year's Day with a dislocated left elbow and badly wrenched muscles. Don swears by all that's holy, that he was stone sober. He said if he had been tight he would not have been hurt when he slipped on the ice. My personal opinion is that it's old age creeping up to him. It just beats the deuce how these old fellows will try to celebrate with us young chaps. Howard Taylor, our Vice-Chairman, was unable to attend the January meeting due to being laid up with a cold, therefore, it was necessary for our good friend, Otto Winter, to come to the rescue and conduct the meeting. Otto, being an old hand, the meeting went on as per schedule with nary a hitch.

CLEVELAND

**R. B. Ossewell, Chapter Publicity Chairman
1585 Hawthorne Drive, Euclid, Ohio**

The January 11th meeting of Cleveland Chapter was held at Guild Hall.

Being honored with the presence of Mr. Ford R. Lamb, our Executive Secretary, the meeting was a closed one. Many things of importance to the welfare of the Society were discussed, and of course among them the coming Machine & Tool Progress Exhibition to be held March 9, 10, 11 and 12 at Convention Hall in Detroit. The Cleveland Chapter is behind this move one hundred percent and here is a brief outline of what we propose to do.

We have appointed a Publicity Committee who will handle all arrangements for members, Engineers, Tool Designers or Executives from Cleveland and vicinity who may attend this Exhibition. We have made arrangements with the New York Central R.R. for special rates, whether a person goes by group or individually. We have information on reduced hotel rates in Detroit and will make reservations for anyone going from Cleveland, for either hotel, R.R. or both.

Now what we ask is, for anyone in our territory who is interested in taking in this Exhibition to phone or drop a line to any of the following, and we will furnish any information you may desire pertaining to the Exhibition.

P. F. Zerkle, Production Tool Co.
J. Balkwill, Production Tool Co.
C. V. Briner, Pratt & Whitney Co.
J. Hawkey, Cleveland Duplex Mach. Co.

Andy Black, White Motor Co.
Ed. Mason, Cleveland Worm & Gear Co.

H. P. Boggis, H. P. Boggis Co.
F. Denning, Jr., Denning Mfg. Co.
C. Mahrer, Lucas Machine Tool Co.
Ed. Linderoth, Barber Colman Co.
R. B. Ossewell, Clark Controller Co.

DETROIT

**R. M. Smith, Chapter Publicity Chairman
12775 Greenlawn Avenue, Detroit, Mich.**

We've been told that "nothing rolls like a ball," but Thursday's meeting at 6:30 P.M. rolled just as well.

As an innovation, a buffet lunch was served, providing a novel change over our normal way of dining. One hundred and fifty were in attendance.

After the dinner, an entertainment was provided by The John E. Livingstone Company consisting of several dance numbers, including an exceptionally well executed acrobatic dance, a few jokes and some mystifying card tricks.

More announcements were made, relative to our Convention to be held in March. Boy! That's going to be something! At this time it was necessary to nominate and elect two of our members to be on the Nominating Committee for the election of Chapter Officers. Messrs. Diamond and Carpenter were chosen for this important part.

By means of colored charts, Mr. Arthur Swenson, of the Sundstrand Machine Tool Company explained to us the functioning of hydraulic pumps and valves, particularly their use in power feed mechanisms. Considerable discussion followed. Movies showing the operation of some of the Sundstrand Hydraulic Machines were explained by Mr. T. B. Buell.

Don't Forget Fellows! Send or phone me at A.S.T.E. offices any information you can scare up for publicity. Pictures too!

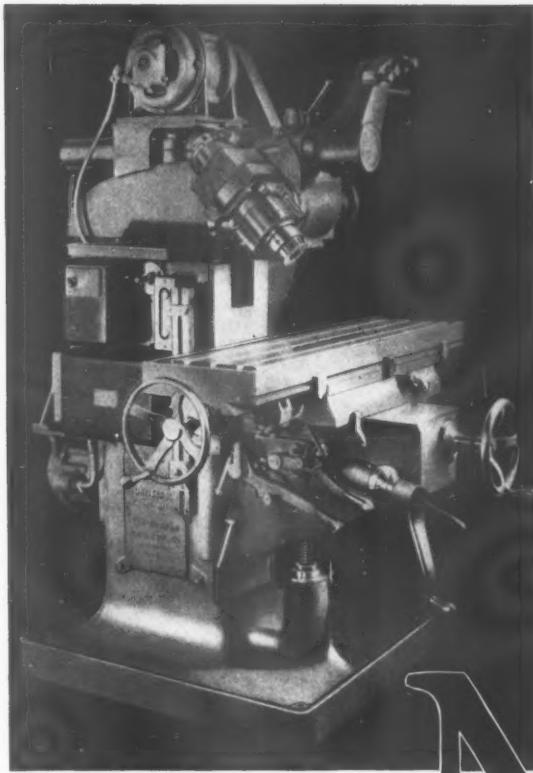
HARTFORD

**Frederic L. Woodcock, Secretary
56 Inlay Street, Hartford, Conn.**

The tenth meeting of Hartford Chapter was held at 8 P.M., Monday, December 27, at the Gas Co. Auditorium, 92 being present.

A. H. d'Arcambal presided and George Carlson of the Arrow Hart & Hegeman Co. acting as Technical Chairman. David A. Munns spoke on manufacturing and machining of plastics, covering the introduction

(Continued on Page 24)



Make minutes do the

work of hours—and watch your toolroom milling costs drop. Save half your present set-up time with a Van Norman Universal Miller that enables you to reset the cutterhead instead of the work—and do it in 30 seconds. Cutterhead swivels to any position. Sliding ram extends the work-range to both sides of the piece. So nine out of ten milling jobs can be finished in one set-up, with no waste of time, no errors from repeated resetting, no waiting for other machines. If you are interested in getting more and better work through your toolroom, pattern shop, or experimental department, investigate the exclusive advantages of Van Norman Universal Millers. One of four sizes will fit your needs. Write for full information. Van Norman Machine Tool Company, Springfield, Massachusetts.

FEBRUARY CHAPTER MEETINGS

Chapter Meeting Announcements must be received on or before the 15th of preceding month to appear on this page. Members and friends of The Society contact Chapter Secretaries for meeting details if your announcement does not appear below.

BALTIMORE

February 14, 1938 — Haussner's Restaurant, 3242 Eastern Avenue. Dinner: 7:00 P.M. Technical Session: 8:00 P.M. **Special Meeting for Members: 6:30 P.M.**

Speaker: Mr. Francis D. Bowman, Advertising Manager for the Carborundum Company.

Subject: "Manufacture and use of Carborundum products."

Please make reservations early by calling HAmilton 0851-J.

give a lecture with slides. They will discuss Mold and Die Designs, and will present charts on comparative properties of various types of plastics; also the finished product.

A second speaker on the program provided through the courtesy of Kordenbrock Machinery, will be Mr. F. W. McIntyre, of the Reed-Prentice Company, Worcester, Mass., who will also show color motion pictures on the Reed-Prentice Injection Molding Machine in operation and explain its workings in detail.

Reservations: Make reservations before February 9 by calling Madison 7980. Tickets will be sold at the door only.

Regular business meeting, Detroit Chapter, 7:30, Feb. 17, 1938, A.S.T.E. Officers.

BRIDGEPORT

February 10, 1938 — Hotel Barnum, 140 Fairfield Ave. Dutch Treat Dinner, Stag Room, 6:30 P.M. Meeting 8:00 P.M.

Speaker: Mr. E. Vom Steeg, Welding Engineer, General Electric Co. **Subject:** "Atomic-Hydrogen Welding."

HARTFORD

February 28, 1938 — Hartford Gas Company Auditorium.

Speaker: Malcolm F. Judkins, Chief Engineer, Firthite Division, Firth Sterling Steel Co.

Illustrated Lecture: "Sintered Carbide Tools."

BUFFALO

February 14, 1938 — King Arthur's Restaurant, 199 Delaware Ave. Dinner: 7:00 P.M. Technical Session: 8:00 P.M.

Speaker: Mr. Howard R. Mellor, Industrial Sales Dept., Socony Vacuum Oil Corp.

Subject: "The Inside Story," sound picture on lubrication problems.

Please make reservations by calling Mr. Ben Buerk, DE 3373.

CHICAGO

February 14, 1938 — Dinner: 6:45 P.M. Dinner, \$1.25 Plate. Technical Session at 8:00 P.M. Machinery Club, 571 W. Washington Blvd.

Speaker: Mr. W. J. Greenleaf, Chief Engineer of McCrosky Tool Corporation, Meadville, Pa.

Subject: "Use and Grinding of Tungsten Carbide Milling cutters." This lecture should be of especial interest to all the members of our Society, and we hope to have a good crowd in attendance for this lecture.

Mail reservations to Chapter Secretary Mr. Willard T. Wilson, 7428 Euclid Avenue, Chicago, Illinois. PLEASE RESERVE EARLY.

CLEVELAND

February 8, 1938 — Visit to the plant of Warner and Swasey Co. Guides will start promptly at 7 P.M. Notify C. V. Briner, Cherry 8034 if you expect to attend. This will not be a dinner meeting.

DETROIT

February 10, 1938 — Dinner: 6:30 P.M. \$1.50 per plate for members, guests \$1.75 per plate. Technical Session: 8:00 P.M. Fort Shelby Hotel.

Speaker: Either Mr. Spencer Palmer, Sales Manager, or Mr. J. G. Slater, representative of the Tennessee-Eastman Company, will

MINNEAPOLIS-ST. PAUL

February 15, 1938

Speaker: John A. Markstrum, Engineer, Ex-Cell-O Corporation.

Subject: "Broaching."

MILWAUKEE

February 10, 1938 — Republican House. Dinner: 6:30 P.M. Program by Wadham's Oil Co.

Subject: "Cutting Oils."

PITTSBURGH

Friday, February 11, 1938

Dinner: 6:30 P.M. **Note change.** Sponsored by Monarch Machine Tool Company, Sidney, Ohio, Blue Room, Roosevelt Hotel.

Meeting: 8:00 P.M. Blue Room, Roosevelt Hotel, Penn Avenue, Pittsburgh, Pa.

Speaker: Mr. F. A. Brandenberg, Sales Engineer, Monarch Machine Tool Company.

Subject: "What's New in Turning Equipment?"

Reservations: Please make dinner reservations before noon, Friday, February 11, 1938.

Call Monarch Machine Company, Atlantic 6428.

Parking: Next door.

ROCKFORD

Joint Meeting with Several Rockford Engineering Societies

Date: Friday, February 18.

Place: Hotel Faust, Banquet Hall.

Time: Dinner, with surprise entertainment at 6:15 sharp.

Reservations: Contact George Sorensen, Woodward Governor Co., by Wednesday, February 16.

Technical Session at 8:00 P.M.

Speaker: C. E. Kraus, Chief Research Engineer, Ingersoll Milling Machine Co.

Subject: "Fundamentals of Metal Cutting."

Discussion to follow lecture.



7
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Dial Indicators for Every Requirement*

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Chapter Doings

(Continued from Page 20)

of the early phenol resins and explaining the progress and development of these universally used materials. His talk was supplemented by a talking motion picture, "The Fourth Kingdom."

Dinner at the City Club preceded the technical session.

MILWAUKEE

Emm E. Houston, Chapter Publicity Chairman
1029 South 35th Street, Milwaukee, Wisconsin

Business recessions and curtailed

industrial production has not affected the Milwaukee Chapter's activity and enthusiasm. The January meeting should be an excellent business barometer for the Milwaukee area as the 160 members attending the dinner meeting were highly optimistic concerning the coming year's business.

Frank Palmer, Assistant to the President of Carpenter Steel Co., Reading, Pa., spoke on that very elusive thing "Personality of Tool Steel." Mr. Palmer stated that up to fifteen years ago no two tool steels had the same controllable characteristics, although

they may have been the same identical brand. Shrinkages and expansion in the heat treatment of tool steel can be held now at very close tolerances.

Milwaukee Chapter elected the following to the nominating committee. Messrs. Arthur Gudert, Harnischfeger Corporation, Arthur J. Seeger, Stanek Tool and Manufacturing Co., and H. Kuehn, Falk Corporation.

There is plenty of interest shown in the Tool Engineers machine show to be held in Detroit in March, among Milwaukee members. At this date the Grob Brothers, manufacturers of continuous filing machines and the Wetmore Reamer Co., reamer manufacturers, have reserved space at the show.

Mr. Arthur J. Seeger, formerly Treasurer and Superintendent of the Stanek Tool and Manufacturing Co., was elected President of the company following the death of Mr. E. J. Stanek founder of the firm.

Milwaukee members remembering the fine show the Wadham Oil Company put on last year will be especially interested to know that this firm is sponsoring the February meeting. The topic will be "Machine Cutting Oils."

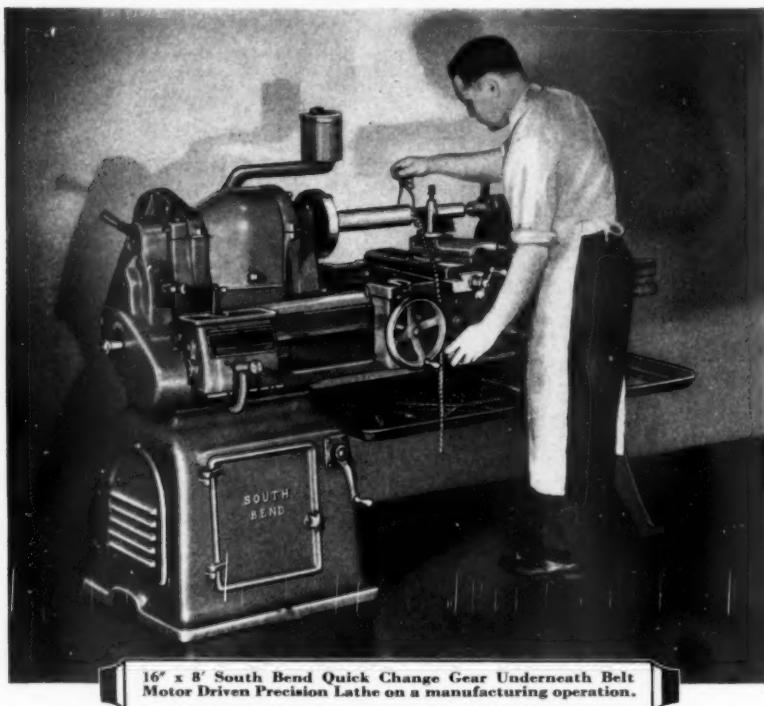
NEW YORK-NEW JERSEY

F. J. Oliver, Publicity Chairman
233 W. 39th Street, New York

Jim Weaver, director of equipment, inspection and tests of the Westinghouse Electric & Mfg. Co., East Pittsburgh, was really the whole show at the January eleventh meeting, held at the Robert Treat Hotel in Newark. As chairman of the Pittsburgh Chapter he brought not only words of greeting, but several members of his group; as chairman of the technical sessions of the Annual Meeting in March, he spread enthusiasm about the meeting and particularly about the Machine & Tool Progress Exhibition; as a member of the Committee on Standardization of Surface Finishes of the American Standards Association, he brought specific news about that activity, and finally as a Westinghouse engineer who has pioneered welded jigs and fixtures, he presented a fine illustrated talk on this technique. He really was an evening in himself!

The picture that Jim painted about the convention and show was an attractive one, and he gave plenty of reasons why a goodly number of tool and production engineers in the Metropolitan area should journey to Detroit in March. The opportunity for members in the less highly

(Continued on Page 30)

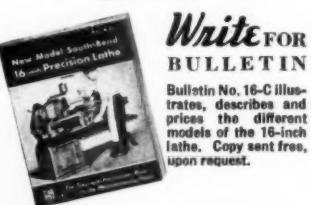


16" x 8' South Bend Quick Change Gear Underneath Belt Motor Driven Precision Lathe on a manufacturing operation.

THE new 16-inch South Bend Series "T" Lathe, with its double wall apron construction, heat treated headstock spindle, and powerful, quiet underneath belt motor drive is the most popular modern lathe for the manufacturing plant, machine shop, and tool room. The lathe has precision for tool and gauge work, rigidity and power for duplicate manufacturing operations, and versatility for the many jobs in the machine shop. An all-around lathe at a price the smallest shop can afford.

68 Sizes and Types of Lathes for every purpose.

9" lathe prices start at \$85
11" lathe prices start at \$371
13" lathe prices start at \$448
15" lathe prices start at \$544
16" lathe prices start at \$642



Write FOR BULLETIN

Bulletin No. 16-C illustrates, describes and prices the different models of the 16-inch lathe. Copy sent free, upon request.

SOUTH BEND LATHE WORKS
929 East Madison Street, South Bend, Indiana, U.S.A.

SOUTH BEND Precision LATHES
MODERN LATHES FOR MODERN INDUSTRY



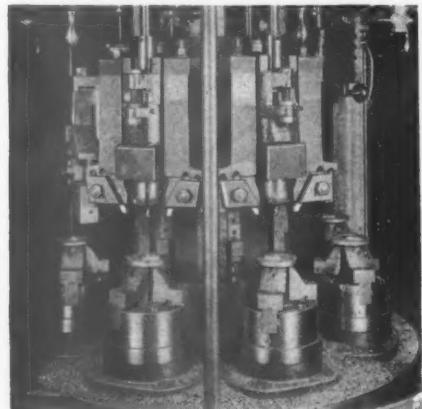
THIS Mult-Au-Matic is tooled to do several different jobs at periodic intervals with only slight changes in tooling set-up . . . However, if for any reason it is desirable to change the sequence of schedule runs, this may be done simply and quickly . . . Mult-Au-Matic tooling to meet such conditions is becoming increasingly popular. Let Bullard Engineers figure your jobs for Series Runs . . . those jobs which are approximately the same design except for dimensional or slight contour differences.



THE BULLARD COMPANY

BRIDGEPORT

CONNECTICUT



HANDY ANDY'S ..WORKSHOP..

With apologies to R. M. Smith for cutting into his publicity stuff, I'd like to make a few comments about Detroit's January meeting. I liked it, especially the informality, being that way myself. Jack Livingstone and Blair Burleigh (of John E. Livingstone Co.) collaborating with Sundstrand Machine Tool Company and Dave Forsman, genial meetings

chairman, put on a real show. Arthur Swenson of Sundstrand, who gave a fine talk on hydraulic feeds, was so interrupted with questions that I can't make any comments on his oratory; anyway, his charts were so clear that he really didn't have to say much. After him, Tim Buell of Rockford (who is cutting quite a swath in the A.S.T.E.) took the spotlight along with movies of Sundstrand machines. The boss should worry about the high cost of labor with such equipment! By the way, I asked Art Swenson to give my regards to Dickey. (Did he do it, Dickey?) And say, work on

the guy, will you?—get him joined up. He's okay.

“Slim” McClellan, incomparable song and cheer leader, took the boys down the shady lane with the songs we like. He's good. Charley Staples, Detroit chairman, must be a Republican—he has balanced the budget. Good work, Charley. He also made a nice li'l speech for John Markstrum, the while we waited to hear what the prez of the Speakers Club had to say. Some other time, eh, John? Where was Denny Fargher? We're going to put you to work, son. And say, did you know that Dan Karpinski is a bloated plutocrat now? Sure, he is half owner in Westlof Tool Co. Want a light for your cigar, Dan?

I've wondered, sometimes, if this column is worth the candle. But during the entertainment one Marty Ryan varied his legerdemain with stories about some of the boys, notably Dave Forsman, the Bills Fors and Smila, Al Sargent and a chap I won't embarrass by naming because he'd had his head simonized. “You know,” the entertainer said, in effect, “if you hear your name mentioned like this you'll know you're popular.” Then, out of a clear sky, a wisecrack about Handy Andy. And it gave me a tingle of pleasure (even if the guy did pan me a bit), so now I know how you boys feel about my quips. Well, I must be popular (some) because I saw Lee Diamond clap his hands. Thanks, Lee.

Personally, I wouldn't bet a thin dime on a writer in a popularity contest. This writing game is a tough racket; you can't please 'em all nohow and if you did your stuff wouldn't be worth a tinker's dam. The public is funny that way. If they like what you write you seldom hear a peep, but if they don't like it—well, then they pan you plenty. And oddly enough, that is the stuff that boosts circulation, for if a writer really has something to say it eventually clicks, even if it does outrage the reader at first blush. For editorials jolt rather than lead the reader away from a beaten path of thought, and people don't like to have the even tenor of existence interrupted. Well, so much for a slant on writing.

Just one thing marred the pleasure of the Detroit meeting for me. For I met several friends who were
(Continued on Page 28)



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Haynes Stellite J-Metal

Cuts Steel Fast.. Lasts Long



Two $\frac{3}{8}$ -in.-square Haynes Stellite J-Metal tool bits are turning this high-speed pinion shaft from $2\frac{3}{4}$ -in. bar stock of SAE 1045 steel. Surface speed—125 ft. per min.; feed—0.017 in. per rev.; depth of cut— $\frac{3}{16}$ in. Thirty pieces are obtained per grind.

HAYNES Stellite J-Metal cutting tools will machine many types of steel at high speeds and heavy feeds without requiring frequent grinding. The job illustrated is one of the many steel-machining operations on which Haynes Stellite J-Metal tools have speeded up production and lowered the tool cost per piece machined.

"Haynes Stellite J-Metal Cutting Tools" is a new 56-page operating manual on all phases of machining with Haynes Stellite J-Metal. It explains the properties of these cutting tools and tells how, when and where to use them profitably. Write or phone for a copy of this book today, without obligation.



A red-hard, wear-resisting alloy of Cobalt, Chromium and Tungsten

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Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 46 apparatus shipping points of The Linde Air Products Company

Handy Andy's Workshop

(Continued from Page 26)

out of work, fine men, capable designers and Tool Engineers, who by all the rules of reason should be working, would be working if government cooperation were extended industry instead of merely expected of it. But, these men were out because of "seniority." Now, seniority is innately vicious because it presumes that the detailer with the

longest employment record supersedes the highly trained designer who came in last. "But," it may be rebutted, "the old employee must be okay, else why was he kept all these years." Because, my friends, detailers are essential cogs in the machine, nor do I for one moment effect any odious comparisons. The wage of the detailer is just as vital to the bread and butter of his dependents as that of the designer.

I just see the thing from a practical viewpoint.

There is this difference between the detailer and the designer, that the one is a plodder, a copier, while the other is creative. The one, because of lack of initiative or innate talent, stayed in a rut while the designer supplemented native ability with intensive study. He sacrificed and plodded, sometimes left a good job to take another at lesser pay, that he might get experience. A hundred detailers (and I don't mean the beginner but the old timer firmly entrenched in the rut) might work for years for one concern, earning their salt according to the scale, but without all of them together advancing one idea of worth. But one designer, with ideas, could easily keep a dozen detailers busy, one trained engineer, with inventive ability and vision, could keep scores busy just making working drawings. In times of depression, then, the trained men should be retained, because with time to think they will be evolving new ideas that effect savings for the employer and, incidentally but of equal import, create work for their fellows. The plodder can't do that.

Here is seniority from the production angle, nor is the case extreme, factual rather. In a certain manufacturing plant a product sells for \$40.00, costs \$50.00 to produce as the program gets under way. But Tool Engineers effect reduction in costs, soon the job shows a profit, which increases as the men on the line get the feel of the thing. Then, recession, with layoffs. Now what? The best production workers, skilled men who have been advantageously disposed and who carry the plodders along, get the axe while some dub who has been dragging castings along the floor in another department takes up the tools of the competent worker and—presto!—production costs soar to double while selling cost remains the same. How long, by arithmetic in any language, would a million dollars last at that rate, assuming volume output? The system is utterly wrong.

I am, personally, an exponent of progress, and progress implies change. But all change is not progress. The seniority system is retrogressive and destined to defeat its own purpose, since it retards rather than promotes employment by de-

(Continued on Page 38)

Less Breakage

WELDON CUPPED-END END-MILL

Weldon cupped-end mills are stronger because of

- 1. Stronger End Teeth**—No weakening nicks at base of teeth.
- 2. No Pockets in Which Chips Can Clog**, thus permitting faster feeds.
- 3. Formed Flute Construction**—Adds greater strength, yet provides adequate chip clearance.
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CLEVELAND • OHIO**

The WELDON TOOL CO.

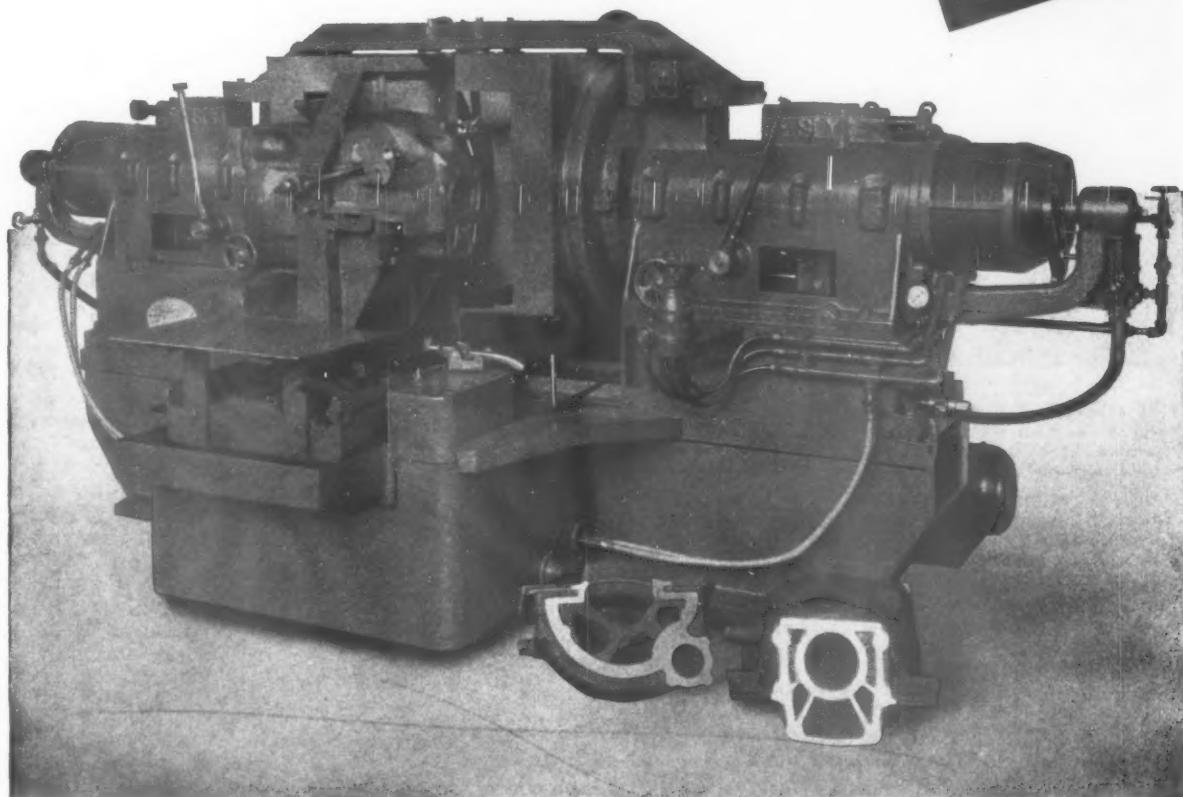
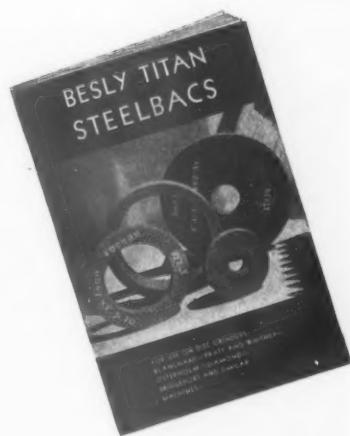
"Pioneers in Fast Spiral Double-end, End Mills"

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• Do you realize what this modern—powerful—Flat Surface Grinder will do toward reducing your manufacturing costs? Hydraulic Feed of grinding members to and from work—Hydraulically Operated Traveling Table carrying work between wheels. Fast, accurate, easy on operator. A remarkable tool for producing flat surfaces at a high production rate. • These improved machines are equipped with Resinoid Bonded Grinding Discs three inches thick—Besly Titan Steelbacs which are making enviable records on all types of Face Grinding Machines.

PUT YOUR FLAT SURFACING PROBLEMS UP TO BESLY

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Chapter Doings

(Continued from Page 24)

mechanized industries in the East to see the workings of the automotive industry should be a drawing card in itself.

Weaver's references to the proposed surface finish standards drew considerable attention from the membership. According to the proposed scheme, finish grades would be divided into 10 classifications, denoted on the shop drawing by a check mark and a number from 0 to 9. The roughest surface 0, would have an

average depth of surface serrations or scratches of 0.063 in. or 63 micro-inches, whereas the 9 surface would have scratches of 0.000004 in. depth on the average. This is somewhat coarser than a finely lapped surface (0.000002 in.) or a Johansson block, which is only half of the latter. An instrument known as a Profilometer has been developed to measure such fine surface variations and to give a direct reading in microinches on a galvanometer. Already some of these instruments are in use in local industries, it was brought out by members of the audience.

In his talk on welded jigs, Jim Weaver traced the development of the art since its inception at Westinghouse 12 years ago. At that time the tool room was crowded with work and delays were quite frequent in getting jobs through, particularly on the part of the foundry. Welding was already being applied in regular production, and the short ends and scrap plate for production material served excellently for jig and fixture components. With welding, it was possible to start in machining the jig body within two days of the receipt of the drawings, instead of three weeks when a pattern had first to be made and then a casting.

To prove out the practicability of the idea, Westinghouse made careful cost studies of about 200 welded jigs and compared them with costs on similar conventional jigs. Savings up to 45 per cent were indicated on drill jigs and up to 15 per cent on milling fixtures. Besides, the jigs were 10 to 35 per cent lighter in weight. These tools were thoroughly utilitarian, and not too handsome, but Jim pointed out that with a little grinding wheel work and filler and paint the appearance would even better than that of cast iron parts. A number of slides were thrown on the screen to show examples of this work.

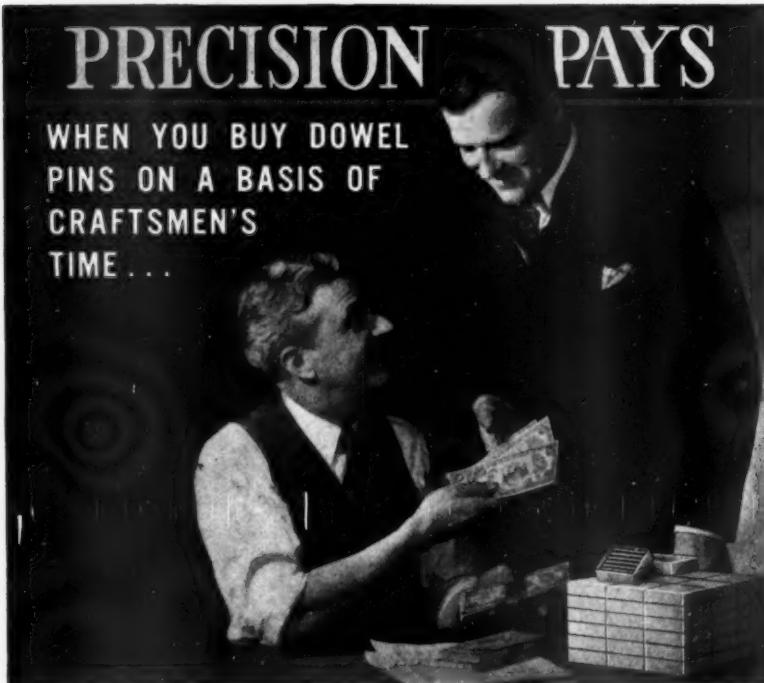
Reporting as chairman of the Entertainment Committee, Tom Orchart of Wright Aeronautical Corp. gave details of a big party planned for members and their guests on Friday, Feb. 18. Arrangements have been made for a supper-theatre-dance at the Casa Manana, the Former French Casino on 50th Street, New York, which was recently taken over by Billie Rose. Supper is to be served at 10:30 P.M. and the two-hour stage show goes on at midnight. Sally Rand and Morton Downey are among the headliners, with Abe Lyman's orchestra furnishing the dance music, so that a rollicking good time is promised. Tickets are being sold members at \$2.50 per person, and out of this the local chapter is to get a rebate which will go toward meeting its normal operating expenses.

John Cetrile, who introduced the speaker of the evening, announced that Clarence C. Stevens, mechanical superintendent of the New Departure Division of General Motors Corp., Bristol, Conn., is to be the speaker at the Feb. 8 meeting. Mr. Stevens will speak on hydraulic applications to machine tools and some of the service problems.

(Continued on Page 32)

PRECISION PAYS

WHEN YOU BUY DOWEL PINS ON A BASIS OF CRAFTSMEN'S TIME . . .



ACCURATE DOWEL PINS cost less than the time of the man who applies them—less than the job they do in production, hour after hour.

Included in the small cost of Danly Dowel Pins are the operations of hardening, grinding and individual inspection to maintain standards within $\pm 1/10,000$ of an inch.

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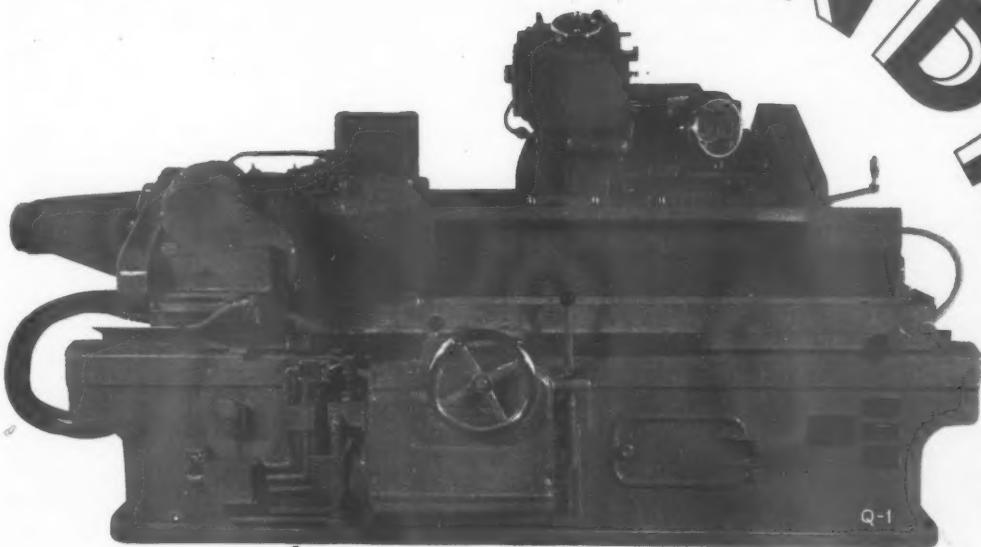
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You get that with all Landis Grinders but we particularly have in mind right now the Landis Hydraulic Cam Grinders. These machines must always do a tough job well. It is essential that they produce within a degree of accuracy seldom asked of any other grinder. Finish, despite the odd shape of the work, has to be above reproach. The machines' many automatic and semi-automatic movements dare not fail.

Landis Hydraulic Cam Grinders have given true, lasting satisfaction. Practically all the world's important automotive manufacturers use this equipment. Most of them have done so for years. And they continue to reorder as additional needs arise. This is no small tribute to the ability of Landis Hydraulic Cam Grinders to stick with their users through thick and thin.

No. 254

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Landis
Tool Company
WAYNESBORO
PENNA., U.S.A.

Chapter Doings

(Continued from Page 30)

PITTSBURGH

J. H. Thomas, Chapter Publicity Chairman
7442 Pennfield Court, Pittsburgh

The Pittsburgh sales office of The Pratt & Whitney Company of Hartford, Connecticut was host to eighty members and friends at the regular December meeting.

Dinner was served in "The Hofbrau" and the speaker was Mr. A. H. d'Arcambal, Consulting Metallurgist, Pratt & Whitney Company. He is also Chairman of Hartford, Connecticut Chapter, A.S.T.E. Mr. d'Arcambal spoke on "Recent Developments in Cutting Tools and Gages."

Chairman, J. R. Weaver read information from National Headquarters on the "Machine Tool & Progress Exhibition," to be sponsored by

A.S.T.E. Bill Schott, G. Young and John Goodman are planning to go up to Detroit and see, "what makes the wheels go round."

We were glad to see in the December "The Tool Engineer" about Ben Brosheer taking an active part in organizing the New York-New Jersey Chapter.

Grace and Dinger from Robertshaw brought an interesting problem along on tool hardening, but Mr. d'Arcambal thought it could be straightened out.

Bill Schott says he will be glad to sign Henry Eisele's application blank. How about starting the new year right Henry?

By the time this item is printed brothers, "Your dues is due," as Andy Brown would say. See Mr. Shelly at the meeting.

The regular January meeting held

at McCann's, Mr. W. D. Turnbull, Manager of Machinery Electrification, Westinghouse Electric and Manufacturing Co. was the speaker.

He traced the progress of machine tool building and the development of electrical equipment used in conjunction with the machine tools from 1888 until the present time. In addition, he gave a "look" in the future of what the electrical industry is doing to help industry of all types. The pictures and practical demonstrations of new equipment were most interesting.

Among the guests of the evening were John H. Daum, Sales Manager of Cincinnati Planer Co., F. L. Loewen, of Carl Zeiss Co., New York City, Charles B. Johnson, of Pittsburgh Equitable Meter Co. Secretary Shelly and Program Chairman Rigdon are vacationing in Florida. I. M. Dinger has replaced Malcolm F. Judking as Chairman of the Exhibit Committee for "The Machine Tool & Progress Exhibition," at Detroit, March 9-10-11-12.

Ed Gangwere has taken over the duties of Secretary until next election.

Wm. C. Vecker and John G. Bunker were elected to serve on the nominating committee for the ensuing term.

Interest is running high, concerning the Machine & Tool Progress Exhibition and many local members are planning to attend.

Next meeting at Hotel Roosevelt, sponsored by Monarch Lathe Co.

See you there.

RACINE

T. J. Santry, Chapter Publicity Chairman
1615 Racine St., Racine, Wisconsin

The regular monthly dinner meeting of Racine Chapter, American Society of Tool Engineers, was held January 17th, at 6:30 P.M. at Meadowbrook Country Club. One hundred and thirty-one engineers and guests attended and it was by far the largest meeting held during the fall and winter season.

The main speaker of the evening was Mr. Swan Bjornberg, Consulting Engineer of the Illinois Tool Works of Chicago, who spoke on the subject: "The Manufacturing of Gears." During his talk he thoroughly covered the history of gear cutting, elimination of gear noises, accuracy of gear tooth parts, kind of methods that should be employed before and after furnace and correct inspection. In his talk he pointed out that in cutting a gear, the machine tool operator must measure the gear in order to determine

(Continued on Page 34)

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Haskins Engineering Service—devoted to helping you find the fastest, simplest and most economical way to solve tapping problems.

Haskins regards it as plain good business to help you get out of the Haskins Tapper all of the speed, precision and long life built into it. That is why in so many plants today fixtures designed by, and methods recommended by, Haskins Engineers are helping to set new performance records on every type of tapping job.

Would you like to know more about the Haskins Method of High Speed, Precision Tapping? Write for complete details and further examples of the many savings it has brought. R. G. Haskins Company, 4642 W. Fulton Street, Chicago.



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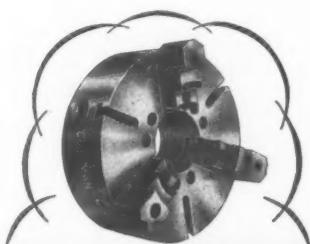
New Cushman Heavy Duty and Extra Heavy Duty Lever-Actuated Self-Centering Chucks, designed for use in conjunction with "Cushmatic" Electric Power Units and Control, will be found equally adaptable to air or hydraulic operation. Outstanding features of

these chucks are the ruggedness and simplicity of their parts, completely sealed in the steel body which is a lubricant reservoir. The chuck face is a hardened steel plate doweled to the body and fastened with hollow head screws. This plate affords such a wide bearing for the jaws that wear is reduced to a minimum.

No matter how hard the service, within their rated capacity these new chucks will long maintain their high initial accuracy.

"Cushmatic" Power Chucking is applicable to all modern automatic and turret lathes having a hollow spindle and on which mechanical chucking is practicable. Our new Electric Chuck Bulletin Number 250 describes the equipment in detail, including price lists and full engineering data. It will bring you right up-to-date on developments in this important field. A copy will be sent to you upon request.

The Cushman Chuck Company,
Hartford, Connecticut. Chucking
Engineers Since 1862.



CUSHMAN CHUCKS

A WORLD STANDARD FOR PRECISION

Chapter Doings

(Continued from Page 32)

mine how much deeper the cutter, hob, or other gear forming tool must be set in order to impart the correct pitch diameter to the finished gear, and that this is true in hobbing, shaping, grinding and lapping operations. He also stated that the correct measurement of pitch diameters of spur or helical gears has been a somewhat difficult procedure, and a variety of means have been employed to solve the measurement problem, such as pins,

balls, ground master gears, tooth calipers, etc. He then pointed out that all these methods have one or more common characteristic faults: they are complicated, difficult to handle, and their readings are often in the surface measured, and to overcome this various sets of measuring blocks were designed to eliminate these difficulties and provide the gear manufacturer with the simplest and most accurate means of checking the tooth thickness and pitch diameter of finished

gears. Lantern slides were shown to fully illustrate his talk, and an open discussion was held following his talk at which time he answered all questions asked by the engineers present.

In addition to the above program, Herr Fritz and his German Band entertained prior and during the dinner.

This was one of the best meetings put on during the present season, and the main speaker, Mr. Bjornberg, was given a standing vote of thanks for the able manner in which he delivered his talk.

ROCKFORD

Herbert O. Olson, Chapter Secretary
1610 Seventh Street, Rockford, Ill.

The January meeting of Chapter No. 12 was held at the Beloit, Wisconsin Works of the Fairbanks, Morse & Co., January 12, who manufacture engines, in sizes and types, from 1½ H.P. farm gasoline engines to 1440 H.P. Diesel Engines; pumps in sizes and types, from small home water supply systems complete, to enormous centrifugal units requiring the entire power output of their largest Diesel Engines or Electric Motor Drives; electric power apparatus, from the smallest Industrial Type Induction Motor to Synchronous Motors of several thousand horsepower capacity; also a complete line of Electrical Generating Equipment to match their engines.

At 3 P.M. a "trek" was begun through the various divisions of this plant which manufacture their greatly diversified products and everywhere was evidence of the versatility of this concern in their manufacturing efforts.

The variety of equipment in this plant ranges from 1000 ton Hydraulic Forging Press with its incident material handling equipment, machines capable of handling crankshafts of 10 tons weight, and 30 ft. in length, finishing these units to the degree of accuracy required for their service, and dynamic balancing of crank shafts; to, the drilling and lapping of holes in fuel injector nozzle tips of .008" diameter.

At 6 P.M. dinner was served in the Plant Cafeteria to 160 members of this Society and their friends, at which time Mr. A. C. Howard, Assistant General Manager of Fairbanks, Morse & Co., expressed his appreciation for the attendance of the members of this Society, despite the danger of icy highways which

(Continued on Page 36)



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 Bissell Steel Company Cleveland, Ohio
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 The Bullard Company Bridgeport, Conn.
 Cedar Rapids Eng. Co. Cedar Rapids, Iowa
 Cimatool Company Dayton, Ohio
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 Stokerunit Corporation Milwaukee, Wis.
 Storm Manufacturing Co. Minneapolis, Minn.
 Sundstrand Machine Tool Co. Rockford, Ill.
 The Taft-Peirce Mfg. Co. Woonsocket, R. I.
 Trubor Tool Company Yonkers, N. Y.
 Tungsten Carbide Tool Co. Detroit, Mich.
 Van Norman Mach. Tool Co. Springfield, Mass.
 Wedell Engineering Company Newark, N. J.
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 Waukesha Tool Corp. Waukesha, Wisconsin
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CARBOLOY SERVICE

Chapter Doings

(Continued from Page 34)

had been braved by most of those attending.

After a splendid meal the meeting was addressed by Mr. G. R. Anderson, Chief Engineer of Fairbanks, Morse & Company's Electrical Division, on the subject of Various Types of Motors and Their Application to Machine Tools. Mr. Anderson's talk was enlightening as some of the problems of motor drives on machine tools including mountings and ventilation were presented. The possibilities of dynamic balance in

these motors were discussed and some interesting points were raised in the discussion following this talk.

Mr. J. R. Perrine, of the Cutler Hammer Company, addressed the meeting on the subject of Controls for Machine Tool Motors, and presented some very enlightening facts concerning the problems encountered in "fitting," these controls to both motors and machines, and made a vital point by stressing the need for closer cooperation between the machine tool designer and the control apparatus manufacturer to allow a more compact and workable control unit, thereby providing a

better performance and appearance of the complete machine.

A most interesting "word picture" of Diesel engine inception and development was presented in the address of Mr. F. P. Grutzner, Engineer in Charge of Diesel Installations, for Fairbanks, Morse & Company. Mr. Grutzner presented his subject in a manner which left very little to the imagination and in spite of the fact that, due to an accident on power lines, the meeting was in darkness during the greater part of the time Mr. Grutzner was talking, he held the undivided attention of the entire group. Most interesting questions were asked after this talk and a very enlightening discussion followed.

Routine business of the meeting consisted of the appointment of a nominating committee, the announcement of a party and dance to be held at the "Paramount Ball Room," at Rockford, on the night of Saint Patrick's Day. An enjoyable evening was promised, including a fine dance orchestra and a captivating "Floor Show."

After an expression of our appreciation for the kindness of the Fairbanks, Morse & Co. by Chairman Dickett, the meeting adjourned with everyone feeling they had spent a profitable afternoon and evening.

TWIN CITIES CHAPTER

M. H. Potter, Chapter Publicity Chairman
Dunwoody Institute, Minneapolis, Minn.

Twin Cities Chapter woke up with a bang and held two fine meetings in December, and Mr. Potter, our Publicity Chairman, showed up absent at both meetings. The Ladies Auxiliary of Something held a meeting the same nights and someone had heard Mr. Van Wyck inferring that it was the reason for Mr. Potter's absence.

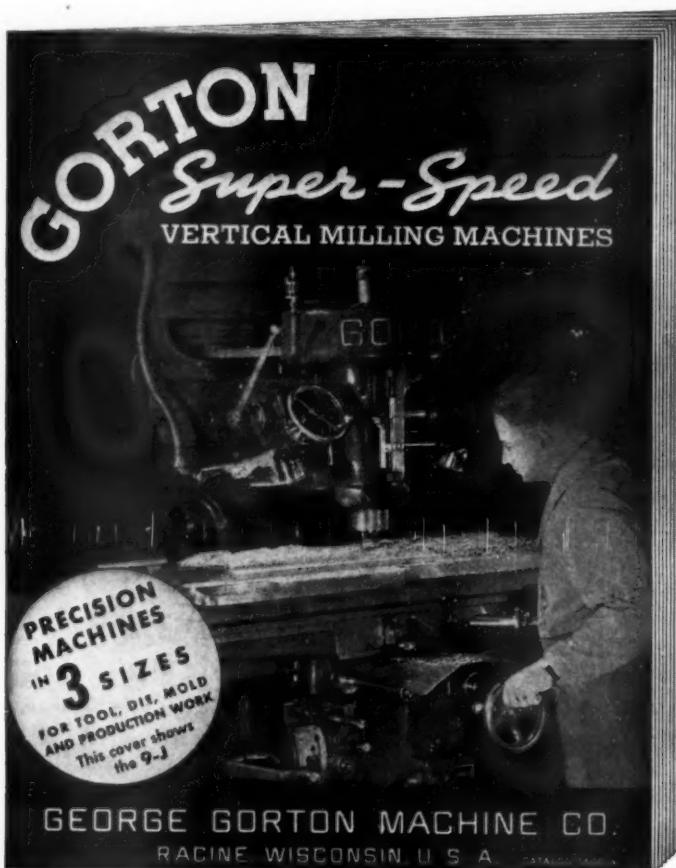
Chairman, Mr. Roby, welcomed members and guests to the meeting held at Minnesota Union, December 2nd.

After the dinner, Mr. Pennington reported that arrangements for meetings were nearly complete for the season.

Mr. A. G. Anderson introduced the speaker, Mr. Newton, District Sales Manager of Lincoln Electric Company. Mr. Newton's subject was "Welding of Dies, Jigs and Fixtures."

Mr. Newton explained the introduction and the subsequent development of arc welding in the Tool Room and Maintenance Departments. A number of interesting

(Continued on Page 38)



GEORGE GORTON MACHINE CO.
RACINE, WISCONSIN, U. S. A.

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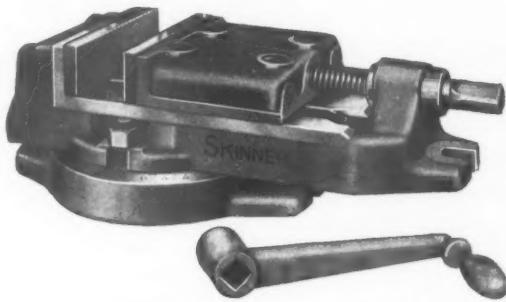


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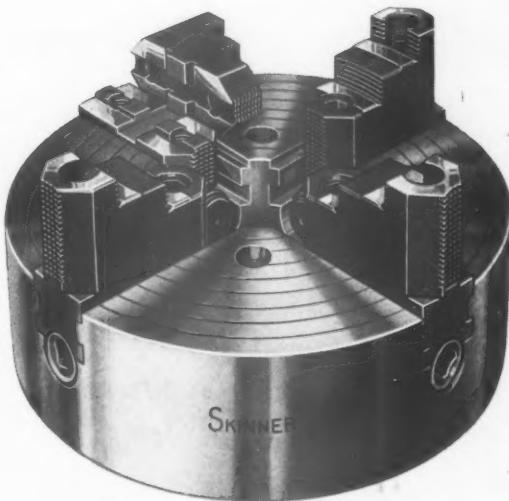
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THE SKINNER CHUCK COMPANY
NEW BRITAIN, CONN.

Chapter Doings

(Continued from Page 36)

slides were used to illustrate the lecture.

Several dies with welded H.S. steel cutting edges were exhibited by Mr. Shultz, of the Donaldson Company, St. Paul.

The second meeting was held December 15 at Minnesota Union where dinner was served to about 60 members.

Mr. A. G. Anderson reported that Farwell Ozmun & Kirk Company of St. Paul had volunteered sponsorship of the January meeting. Details to be announced later.

Mr. J. B. Buell of Sundstrand Machine Tool Company was the speaker of the evening.

Mr. Buell described, with the help of some very fine slides, various types of machines made by Sundstrand. He also showed several reels of Machine Tool operations taken at International Harvester, General Motors and Chrysler Plants.

The meeting was a huge success judging from the questions asked. Mr. Bouvier asked some good ones.

We are much indebted to Mr. Buell and Sundstrand Machine Tool Company for a fine and instructive meeting.

Chuck Operations

(Continued from Page 15)

ber of cutting tools to operate simultaneously at high speed. The machines are equipped with a special carriage having a vertical face on which the tool slides are mounted as seen in the photograph showing the tooling for the first and second operations. The tool slides are thus brought close to the work and can be applied without excessive overhang or interference. Cam segments on a single master drum actuate the tool slides, thereby giving each tool slide its own individual rate of feed.

The above illustrations are typical of many others we could mention. A careful analysis of these, and a comparison with former methods would literally teem with progress and romance.

We in the mechanical field do not have to resort to the use of the phrase from "Stage-coach to Streamliners" as an illustration to bridge a space of time when from "Carbon tools to Carbide" would be equally expressive and neither does romance have to be placed in the surroundings of "the Old Mill Stream." We can find plenty of it in our daily tasks. It is a matter of perspective.

Handy Andy's Workshop

(Concluded from Page 28)

vitalizing industry and penalizing the competent. Nor will the condition improve because extraneous forces have arrogated bargaining rights for all hourly rate employees in industry, which includes engineering workers in that bracket. That is one shackle that the latter must break, for their own economic salvation. The merit system must prevail, else the qualities that make for progress will be discouraged, there will be no incentive. But I can't expand on that now — my space is all taken. See you later.

H. A.

St. Louis to Have A.S.T.E. Chapter

Much interest in a chapter of the American Society of Tool Engineers has been shown in St. Louis, Missouri.

Preliminaries toward the installation are being handled by Mr. E. A. Doogan, 2025 E. Fair Avenue, St. Louis, Mo. If you reside in the greater St. Louis area contact Mr. Doogan if you are interested in this new chapter.

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HYDRAULIC VALVES--
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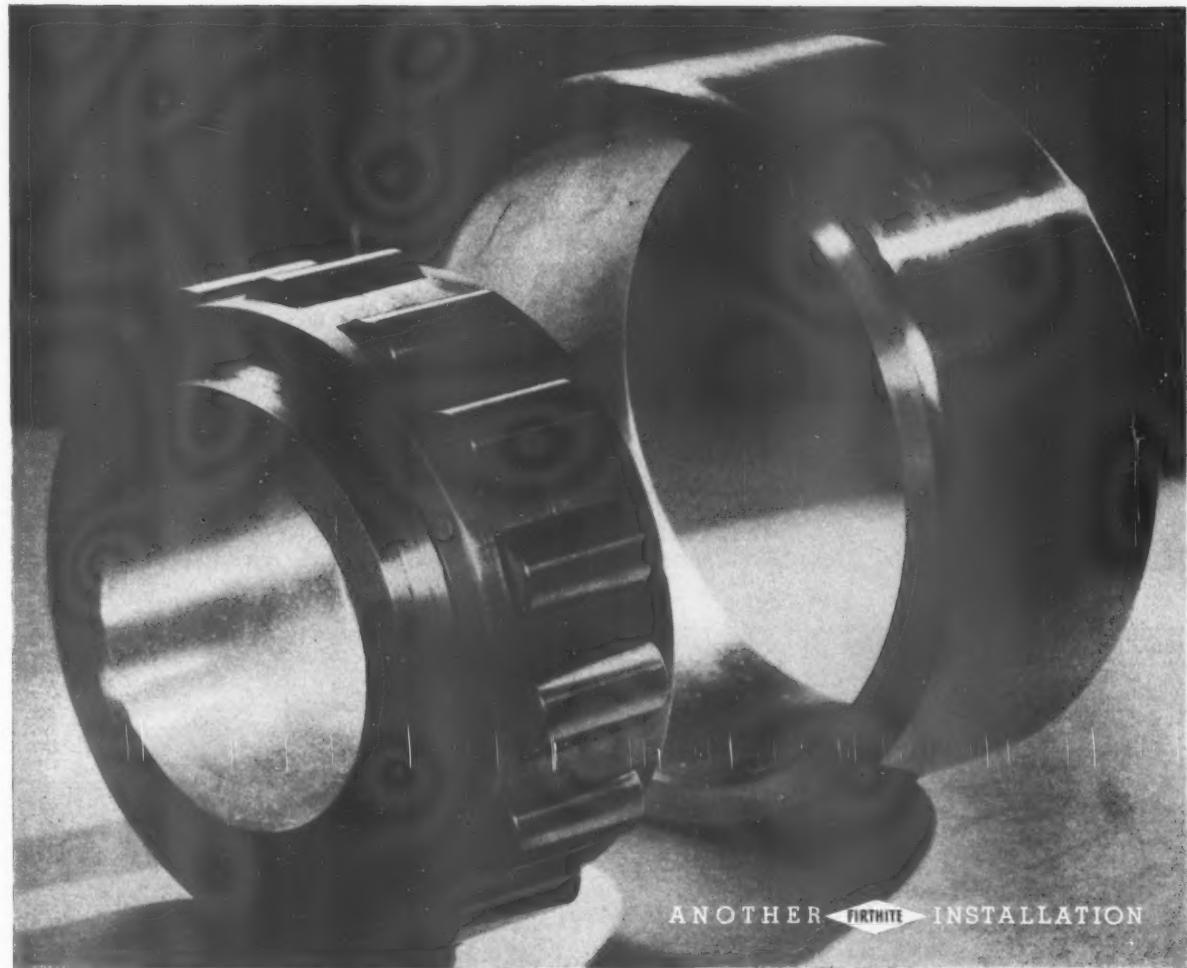
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Modern Time Study

(Continued from Page 17)

installed for bench operations. Air-operated vises, turntables, indexing fixtures, wrenches, rotary files, screw drivers and many other power driven energy saving devices should be made use of. If the operation is composed of many elements, perhaps several of these devices can be arranged on the bench top in the right order so that the job elements can be done in sequence. If the operation is simple, perhaps two units of the same kind can be installed side by side to

permit two-hand activities.

Many productive parts can be inspected by two-handed methods if the tool designer will provide duplicate equipment. When inspecting holes, for example, double-ended plug gages are generally used where the "go" member is contained in one end of the gage body and the "no-go" in the other. Often, it is profitable to remove the "go" and "no-go" members and insert them, instead, side by side within a short distance of each other, in the face of a small angle plate bolted to the bench top surface. Thus, these gage members, in their horizontal

positions, and pointing toward the inspector, lend themselves to a synchronous use of both hands as follows: one hand picks up an un-inspected part and tries it on the "go" member at the same time the other hand is trying the previously handled part on the "no-go." One hand is scheduled to pick up a new part, try it on the first station and then pass the work on to the other hand which tries for the "no-go," after which it is passed to the good or bad work receptacles. By this arrangement, not only are the two hands at work gaging two different pieces of the same work, but both hands are in action simultaneously in "upping" and "awaying" the work.

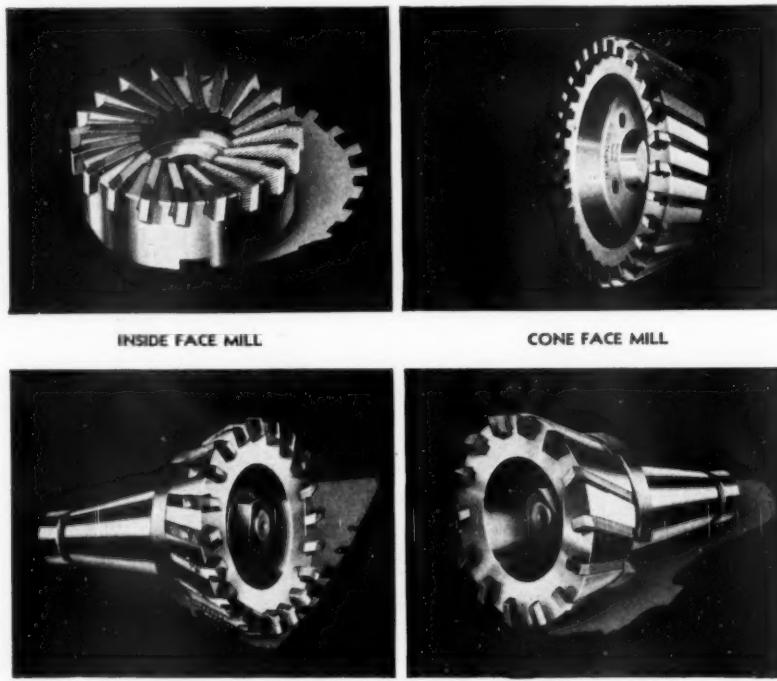
Two sets of certain types of snap, thread, depth, thickness and profile gages can likewise be fastened to angle plates for two-handed inspection work. Other gages can be designed in such fashion as to permit sliding the work in and out of gage points, rather than by lifting the work. Those gages containing flush pins, swinging arms, dial indicators, arranged in the proper series of sequence, allow the inspector to use both hands continually and increase his daily output of inspected work.

After you tool designers have provided the best types of tools, why don't you camp on the tail of management until it provides a suitable box for each operation in which every tool, gage, wrench, chuck, nut and screw can be stored in holes or between partitions, and kept in the tool crib when not in use? If that box contains delicate tools and gages, small sponge-rubber pads should also be provided for bench tops and machine tables, so that an operator need not be so careful in letting go of a tool when he is momentarily through with it.

What is the cost of doing all of these suggested things? One way of finding out is to arrive at the estimated cost of the plain, orthodox tool equipment usually thought of as being satisfactory. Afterward, cost estimates should be prepared for the best time and labor saving tool equipment. The differential between the two costs is the figure to shoot at. If, by use of the more modern type of equipment, the cost of it can be absorbed in two years, the investment is worth while. This two-year amortization plan may be somewhat severe in some industries, but it usually suffices.

One thing to keep in mind is, that the purchasing agent of your factory

(Continued on Page 47)



GAIRING LOCK

CUTS Cutter Blade COSTS

GAIR-LOCK Milling Cutters --- shell, side, face, interlocking and alternate tooth --- provide you with cutter heads accommodating a maximum number of blades, with a rigidity that produces solid tooth cutting action.

Blade cost is cut because blade life is tripled.

And there are other economies that will help cut your cost-per-piece. Write for Bulletin No. 204 - it contains full details.

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Buy Barber-Colman GROUND HOBS for Economy

Proved by Performance

Packed in individual boxes, Barber-Colman Ground Hobs go out into service. Their first cut proves their unexcelled accuracy and ability to create fine finish. Their first run proves their ability to save on production and operating costs. The quantity of uniformly high-quality work produced before their first sharpening proves that Barber-Colman Ground Hobs save on set-up time and sharpening costs. Repeated runs throughout a long life prove again and again the wisdom of buying Barber-Colman Ground Hobs for accuracy, for value . . . for economy.



PRODUCTS

MILLING CUTTERS,
HOBS, HOBBLING
MACHINES, HOB
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CHINES, REAMERS,
REAMER SHARP-
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SPECIAL TOOLS

BARBER-COLMAN COMPANY

General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

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Barber-Colman Company
3030 Euclid Avenue

DETROIT, MICHIGAN
Hodges Machinery Company
544 New Center Building

MILWAUKEE, WISCONSIN
Dumser & Schroeder
610 West Michigan St.

Production Perspectives

(Continued from Page 18)

tion changes and without any break in manufacturing schedule. The transfer went into effect January 1. Porter-Cable Machine Company will now concentrate all their production facilities on their portable tools for woodworking, including saws, sanders and polishers. **E. R. Fish is chief engineer of the Porter-Cable lathe business under the new Lipe ownership.**

Clarence E. Jacobsen has been elected vice-president of the Chicago-Latrobe Twist Drill Works. He

will have charge of eastern territory sales, with headquarters in the Public Ledger Building, Independence Square, Philadelphia.

Several manufacturing plants in New England see prospects of production gains this month. Westinghouse Electric & Manufacturing Company has added to its active force for a seasonal increase of refrigerator output and now has 3,800 employed, about 3,250 of whom are in the factory departments. **Production schedules for major household appliances are reported to have been set at a good level for the first half of the year.** At the Westinghouse

plant in Chicopee Falls, Mass. about 650 are employed, or 100 in excess of a year ago, with a possibility this number may be increased slightly as new products pass from the engineering to the production stage. Removal of radio production to Baltimore is not expected to get under way until after April 1. Other lines are being built up to partially offset this loss of operations.

Chapman Valve Manufacturing Company of Springfield, Mass., has made an excellent start for the year, having about 1,700 persons employed full time, of whom 1,500 are in factory departments. This is said to exceed the employment level at any time in 1937. With good business ahead in government and municipal work and the oil companies having much construction work scheduled, along with continued activity in the chemical field, prospects for the year's business seem bright at this establishment. The company has just paid a \$2 dividend to stockholders.

Plans of the radio industry to bring out new models in advance of the time fixed in recent years are expected to hasten revival in the radio department of the United American Bosch Company, Springfield, where sets are produced for different organizations selling under their own nameplates. At present all departments of this plant are curtailed, and while some operations are on full time, the majority are limited to three or four days a week. Indications are that some improvement will develop in this quarter.

Smith & Wesson, Inc., Springfield, has been increasing its force gradually for more than a year and now has about 350 employed, the largest number in four years and more than double that of a year ago. Considerable benefit is reaped, it is said, from the movement of police departments and sheriffs throughout the country to improve and standardize their weapons. Orders from South America are said to have shown an increase and the .337 Magnum revolver brought out a few years ago is said to be growing in favor.

Indian Motorcycle Company's production at Springfield, which is falling off slightly at present, is expected to swing back before the end of the month on the strength of new business for which good prospects are reported, including sizable municipal orders. While the number of employees has been little reduced at this plant, working hours are on the base of 35 hours a week. Production

(Continued on Page 54)

If
YOU HAVE A
BORING JOB
THAT'S A HARD
NUT TO CRACK-
try
**DAVIS BORING
TOOLS!**

Have you an **UNUSUAL** Boring Job in your shop? One that's decidedly "different" or difficult—or that's costing you too much by present methods?

If so, we sincerely urge you to investigate at once the full possibilities of **SPECIALLY-DESIGNED** Davis Boring Tools.

In hundreds of shops—under all sorts of conditions—Davis Boring Tools have invariably brought about faster production, better work, lower costs. Some of our specially-designed, single-purpose tools have saved as high as 75% in boring time, besides producing better work!

Send us prints of your work, and let our Engineering Department make **YOU** a specific, money-saving recommendation. No obligation. Write us today!

DAVIS BORING TOOL DIVISION
LARKIN PACKER COMPANY, INC.
ST. LOUIS, U.S.A.

DAVIS BORING TOOLS



ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3803

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Model 10 Stub Lathe Grooves Pistons At High Speed and Low Cost

The automatic cycle, ease of operation, stamina, and adaptability of the Model 10 Automatic Stub Lathe assure continuous high production, accuracy,

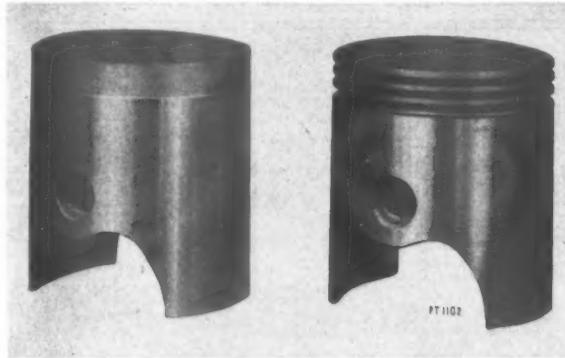


Fig. 1 — Alloy steel pistons before (left), and after (right) grooving on Sundstrand Model 10 Stub Lathe.

and economy on grooving the pistons shown in Fig. 1. Material is cast alloy steel. Three grooves are roughed and finished to limits of $.0005"$ on width. As shown in Fig. 2, the standard Sundstrand Model 10 Automatic Stub Lathe is equipped with a hand-operated mechanically actuated collet chuck which grips the blank piston close to point of grooving, and a cross-feeding front carriage similar to that at the rear. This assures a powerful grip on the work-piece, with minimum overhang; provides solid support for the magazine-type tools with cemented carbide tips which are used on the rear slide for roughing and on the front slide for finishing. Establishment of the automatic operating cycle, tool set-up and replacement, work handling, and machine opera-

tion are all extremely simple and easily accomplished. As a result; high production, close limits and fine finish are maintained steadily at low cost. A subsequent order for another of these Model 10 Stub Lathes testifies to the success of the original installation.

Sundstrand Automatic Stub Lathes are equally effective on long- and short-run work; on complex or simple operations; are easily adapted to a wide

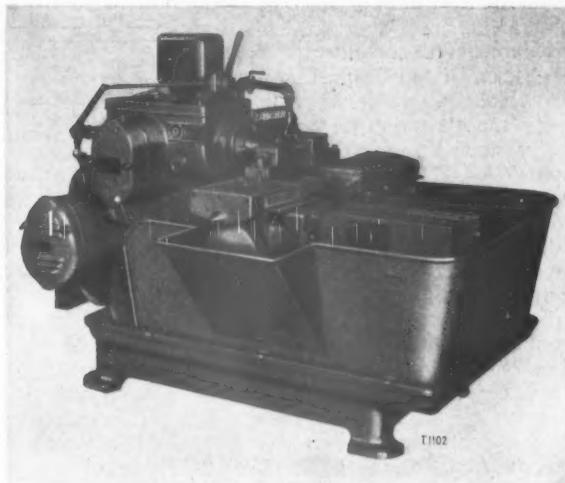


Fig. 2 — Sundstrand Model 10 Stub Lathe for accurate, high production piston grooving.

variety of work. Investigate. Write for machine details, send drawings and data for reliable estimates.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, ROCKFORD, ILLINOIS, U.S.A.

RIGIDMILS - STUB LATHES

Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery



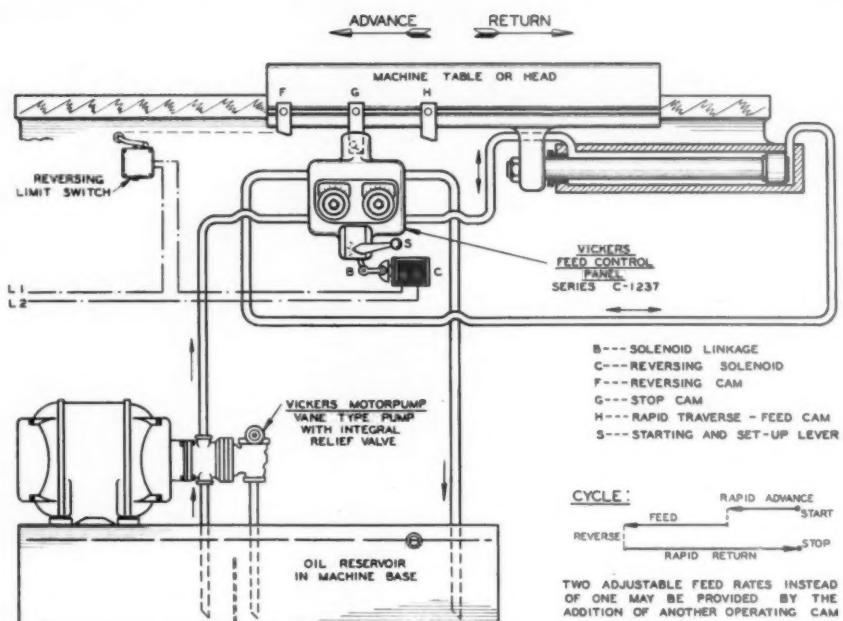
VICKERS HYDRAULIC CONTROLS PROVIDE FLEXIBLE MACHINE TOOL OPERATION

ONE of the most easily applied and yet most flexible machine tool hydraulic control installations is shown schematically by the circuit diagram on this page. This type of hydraulic control installation has become extensively used throughout the machine tool industry on drilling, reaming, boring, turning, milling, and other machines having equivalent operating cycles.

The hydraulic installation proper consists of but two units. The first is a Vickers Motor-Pump Assembly, which is made up of a 1200 R.P.M. electric motor directly coupled with a Vickers Balanced Vane Type Rotary Pump having an integral pressure overload Relief Valve. The second unit is the Vickers Feed Control Panel, which is available with many modifications for meeting various specific requirements. As will be noted, only four piping connections are required, two being made with the feed cylinder, one from the pump to the panel, and one return line from the panel to the oil reservoir.

This hydraulic control arrangement is adaptable to a wide variety of operating cycle requirements, for it will provide any cycle sequence as made up of rapid advance, adjustable coarse feed, adjustable fine feed, and rapid return motions. When only one feed rate is required, the other may be completely disregarded. Provision can also be made for "jump feed" cycles, wherein it is required to have a rapid traverse motion between feeds. Thus, it will be found that practically any machine tool "rapid traverse and feed cycle" requirements can be met with ease.

It is interesting to note that there are but two moving parts in the Vickers Series C-1237 Feed Control Panels. This fact contributes to the simplicity and compactness of design. Also interesting to note, is that the panel may be remotely controlled in those instances when it



is located at some point on the machine where the control lever is not within the operator's reach. For this situation, two solenoids are provided instead of the single one shown in the circuit diagram and push button control at the operator's position is used. The manual control lever, in this case, is then employed only for set-up.

The hydraulic circuit in the panel employs the well-known Vickers Hydrostatic Feed Control Valve and "locked circuit" combination, which provides a smooth and constantly maintained feed rate for any given feed adjustment, regardless of any fluctuations in cutting tool resistance or any changes in hydraulic operating pressure which may take place.

The feed rate (or the two feed rates, if required) may be adjusted within the specified range with infinitely variable graduation. These adjustments can be made during the actual feeding operation, should this be desirable during tool set-up. Or, these feed rates may be locked against accidental change by tightening an acorn nut provided for the

purpose at the center of the chromium feed rate adjustment dial.

Operating pressures up to 1000# per sq. in. may be utilized. Vickers Balanced Vane Type Pumps are designed to handle pressures up to this maximum figure under either intermittent or continuous duty operation. These pumps are available with or without integral relief valves, and either separately mounted or directly mounted upon suitable electric drive motors. They are available in many different capacities, and may be selected so that each particular operating condition is suited.

Vickers, Inc. are prepared to furnish an extensive variety of standardized hydraulic control valve, control panel, and pump units for such machines as require more complicated cycles of operation. A large engineering staff is maintained to make recommendations for various requirements and to cooperate with machine and tool designers in applying hydraulic controls.

Located at Detroit, Mich. (1416 Oakman Blvd.), Vickers Inc. is centrally situated within the production manufacturing area.

Letters

Foster Machine Co.
Builders of Special Machinery for All Fibers
Westfield, Mass., U.S.A.

December 30, 1937

The Bramson Publishing Company
2842 W. Grand Boulevard
Detroit, Michigan

Genilemen:

The members of our Engineering department have read with interest the article on "Inventiveness" by Lev. Trofimov in the August 1937 copy of "The Tool Engineer."

We would like to know if it is possible for us to get reprints or tear sheets of this article. We would like at least half-a-dozen for use in our Engineering department.

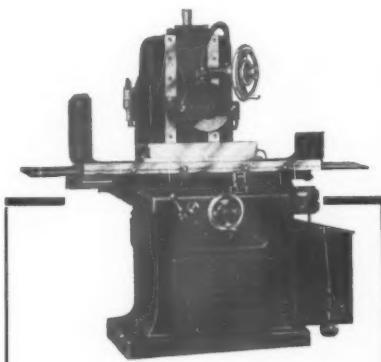
The "QQSTH" is especially good. Thanking you in advance for your co-operation, we remain

Yours very truly,

Foster Machine Company
A. W. Arterton.
Asst. General Plant Mgr.

One copy (our last) has been sent to you, Mr. Arterton. Glad to know your men liked the article. Why don't you all attend a monthly meeting of A.S.T.E. in Hartford—you're invited—Editor.

(Continued on Page 46)



This No. 35 Grand Rapids Hydraulic Feed Surface Grinder is ideal tool room equipment where accuracy and fine finish are required.

You owe it to yourself and your associates to get our catalog now.

Gallmeyer & Livingston Co.
313 Straight Ave. S.W.
GRAND RAPIDS, MICH.

JARVIS GROUND FROM THE SOLID ROTARY FILES

Jarvis ROTARY FILES are ground from the solid with the head and shank in one piece. The various shaped blanks are machined, hardened and finally the teeth are ground into the solid, hardened blanks.

Jarvis Rotary Files may be reground by us many times at a fraction of their original cost, thus bringing the price of the file below the cheapest hand cut file.

Jarvis Rotary Files are perfectly balanced and true running—designed to outlast average files by several times.

JARVIS MULTI-BIAZ FLEXIBLE SHAFT MACHINES

The proper JARVIS Rotary Tool driven at the proper speed by a MULTI-BIAZ FLEXIBLE SHAFT MACHINE will save expensive time and labor for the metal worker.

JARVIS-built MULTI-BIAZ UNITS are furnished in bench type, roller floor type and overhead suspended type. They are equipped with $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ H.P. motors with 3 and 4 speeds up to 7,000 R.P.M. Use JARVIS tools on the MULTI-BIAZ for: Rotary Filing, Grinding, Polishing, Lapping, Buffing, Sanding and Cleaning.

Other JARVIS flexible shaft units from 1750 to 18,000 R.P.M.

Write for new catalog showing a complete line of Jarvis Rotary Files and Flexible Shaft Equipment. It's just off the press!

THE CHAS. L. JARVIS CO.
MIDDLETOWN

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See us in our booth at the A.S.T.E. Machine & Tool Progress Exhibition, Detroit, March 9-12



COUNTERBORE SETS for Every Purpose

EACH TOOL CRIB needs at least one set of interchangeable counterbores and countersinks. Lost machine time, lost man time, when needed tools are not available is too costly—send your order in today and save those expensive delays.

Choose the counterbore set size by the range of work you handle in your plant.

Write for complete data on the Eclipse Radial Drive Counterbore, today.

FOR YOUR TOOL ROOM



Solid pilot counterbores, with deep flutes, provide ample chip clearance for deeper (over $\frac{1}{4}$ of their diameter) counterbored holes.

Every jig, fixture and die shop needs this set for machining holes for filister head screws.

All sets are priced at standard list and discount with no extra charge for the sturdy portable boxes

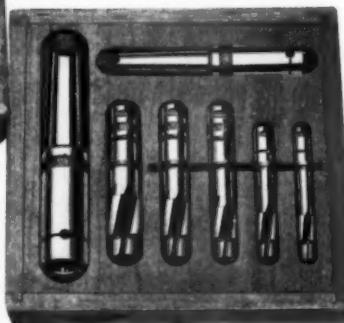
ECLIPSE COUNTERBORE COMPANY
DETROIT 7410-30 ST AUBIN AVE MICHIGAN



Set No. 4 above contains counterbores 1-2" to 1 3-8" with standard sizes of suitable pilots and several countersinks.



Set No. 3 above includes counterbores 1-2" to 2 1-2" with several sizes of standard pilots for each cutter, and 60°, 82° and 90° countersinks.



Letters

(Continued from Page 45)

Servel, Inc.

Evansville, Indiana

The Tool Engineer,
Detroit, Michigan

Gentlemen:

Would appreciate very much your forwarding us about five application blanks and information pertaining to membership in the American Society of Tool Engineers.

Thanking you in advance for this courtesy, we are,

Yours truly,

H. W. Ferguson
Tool Supervisor

Blanks and full information have been sent you. In your city are, no doubt, many Tool Engineers who would be interested in establishing a branch of the A.S.T.E. there. We will be glad to work with you toward that end—write me—Editor.

▼ ▼ ▼

Bramson Publishing Co.,
Detroit, Mich.

Gentlemen:

I would appreciate your mailing to me a copy of the December 1937 issue of "The Tool Engineer" in order that I might have the first installment of the article on "Modern Time Study."

With many thanks, I remain

Yours truly,

N. Arvid Peterson
1828 So. 50th Ave.
Cicero, Ill.

December copy sent you. Glad to be of service. Have you any suggestions for other articles of particular value to you in your work?—Editor.

VICE

For DRILL PRESS. Often Used on MILLER, SHAPER or PLANER
Jaws 6", 9" and 12" Long

Fig. 1 With Jig Attachments



The Attachments mean much duplicate drilling without expensive jig making.

A simple single-purpose jig will cost more than Vise, Fig. 1, which will do many jobs.



Good as a Plain Vise

Fig. 2

Without Jig Attachments

Flanged at bottom for bolting down, with slots at large end,—not shown. All Vises are drilled to take Jig Attachments. These holes are convenient for attaching stops.

ANY VISE WILL PAY

More time lost catching work than drilling.

Send for Circulars

THE GRAHAM MFG. CO.
72 Willard Ave. PROVIDENCE, R. I.

Modern Time Study

(Continued from Page 40)

is continually shopping around for better material prices—he is always trying to save a few cents on every pound, yard or piece of work. Improper tool design can easily dissipate these pennies; why not save them and others too. In these days of shorter working hours and higher labor rates, tool designing takes on a new significance. Keep in mind also, that by his standards, the time study man is evaluating your work. If your tool designs are excellent, they contribute immeasurably to a favorable profit and loss statement. Provide the best tool equipment at the outset; don't provide ordinary old fashioned tools at first and then improve them later. Sometimes the delayed improvements might not be allowed by management—it may decide the improvements are not necessary despite the cost estimates referred to.

On the other hand, in some instances, improvements later made, may make everyone much happier. Let me emphasize that possibility and also bring this discussion to a close by telling one more story. In a sanitarium where but mental cases were treated, a large, open-air swimming pool was built for the benefit of the inmates. These patients had so much fun diving into the newly installed pool, the board of directors met and decided to put some water in it.

THE UTILITY SLEEVE

Removable Taper Shank

TOOL DRIVER

CUT SMALL
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SIMPLE,
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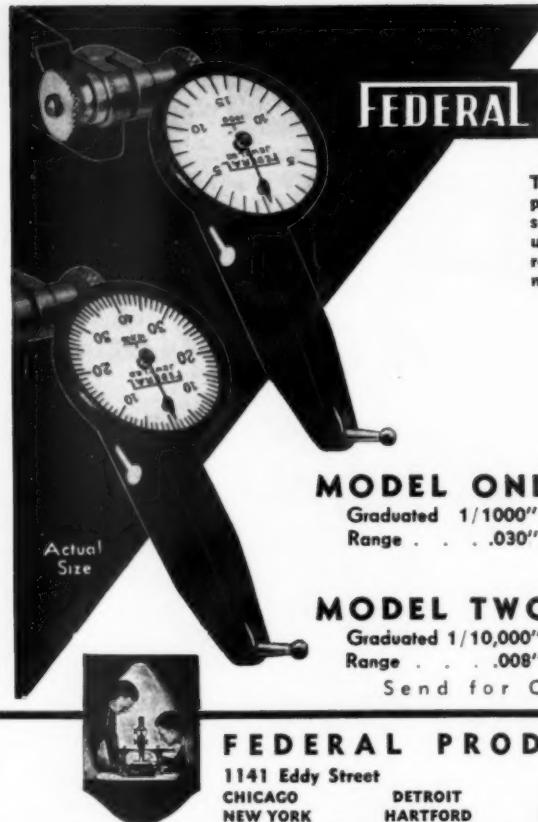
You'll Find
THIS HANDBOOK
Invaluable!

A convenient, pocket size handbook—packed full of informative and extremely useful data on gages and gage standards. It has been prepared for the practical man who requires essential facts in compact and easily accessible form. While the present supply lasts, requests for this handbook will be given immediate attention. Write for your copy . . . NOW.

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in TWO MODELS

These FEDERAL Small Test Indicators are exceptionally compact and adaptable precision instruments. Their lightness and sensitivity are of especial value with regard to accuracy when used with light supporting members. By merely shifting the reversing lever the motion of the point is reversed. The instrument has a FEDERAL Low-Friction Jeweled movement.

They can be used
in surface gauges,
height gauges, or
tool posts and are
quickly adapted to
special fixtures.



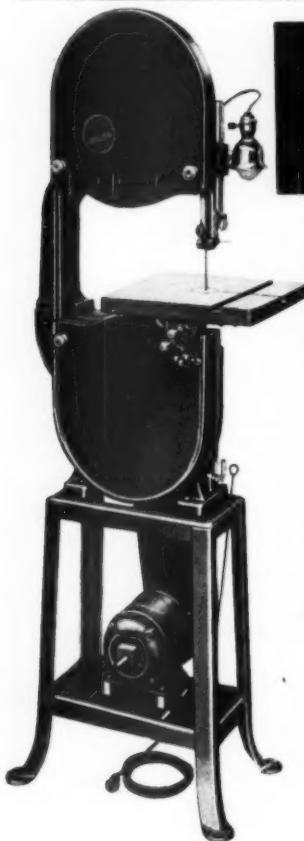
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New Metal Cutting 14 inch BAND SAW

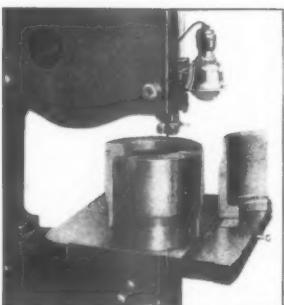
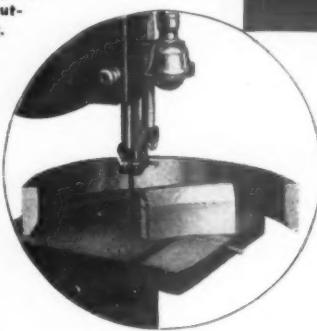
The regular 14-inch Delta band saw, fitted with countershaft to reduce the speed, has been used in hundreds of shops for cutting Iron, Steel, Brass, Bronze and Aluminum bars, shapes and sheets; in foundries for cutting off gates; in die-casting shops for trimming and sawing castings. Here is a new and improved back-gearied model which is even more ideal for this work. It is the perfect machine for the general machine shop, toolroom or experimental shop, where many different materials must be cut.

It takes the place of a power hacksaw in cutting off bars and shapes; it is used in the toolroom for sawing off tool, die and fixture stock; it will cut uniform strips from sheets; it saves hours of time in cutting templates and similar tools, and will cut almost any material, such as asbestos, mica, vulcanite, fiber, etc. . . . difficult to cut by ordinary means. It will "double in wood," too, by a simple change of belts, as provision is made for four low metal-cutting speeds and one high speed for wood sawing. Write for special circular giving full details and specifications.

\$79.50

14" back-gearied Metal-Cutting Band Saw, complete with guards, 8" arbor pulley for wood and cone pulley for metal. With one 14-tooth metal-cutting blade. Without light attachment, belts, stand, motor or motor-pulley. Shipping weight 175 lbs.

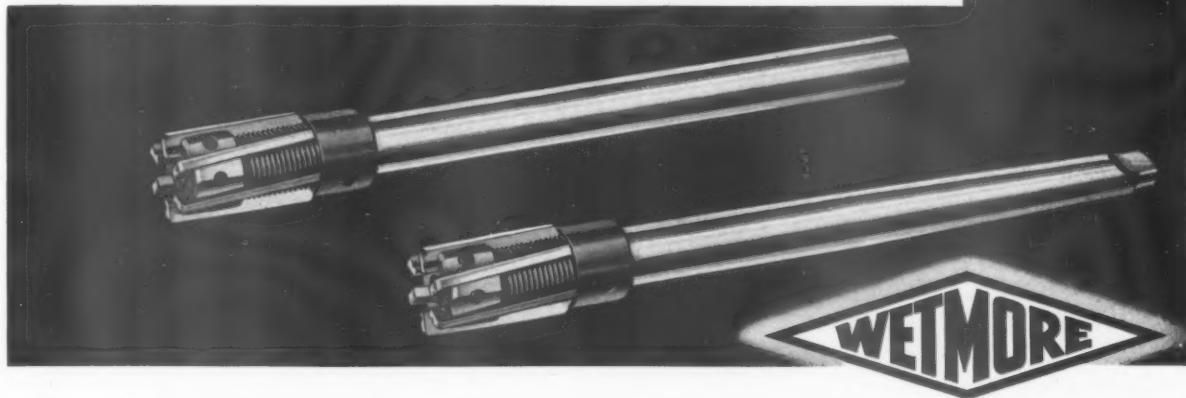
DELTA MFG. CO.
673 East Vienna Ave.
MILWAUKEE, WISCONSIN



One of these drawdie segment rings was impractical to cut on the milling machine because of the diameter of cutter required; the other because the diameter of the ring was too large for the milling machine. Both, however, are cut with ease and speed on the Delta band saw. Try your next "awkward" job on one of these versatile tools.

Left Hand Angle Cutting Blades A Feature Of This Fine $\frac{5}{8}$ in. to 31/32 in. WETMORE REAMER

The Type No. 36 Wetmore Adjustable Heavy-Duty Reamer is noted for easy adjustment, long blade life and marked adaptability to screw machine work . . . features of the famous Wetmore design. Write for Catalog No. 36.



● SPECIAL TOOLS

Designers and tool engineers are invited to avail themselves of our consulting service on all reaming operations—standard or special. We build practical and efficient special tools to decrease your manufacturing costs.

WETMORE REAMER COMPANY - Dept. TL, 420 N. 27th St., Milwaukee, Wis.



TEE SLOT BOLTS

FOR USE ON PLANERS, BORING MILLS,
MILLING MACHINES OR OTHER
MACHINES WITH SLOTTED TABLES

THESE bolts are manufactured in the same factory as the well-known "O. K. System of Inserted-Blade Metal Cutting Tools," and with the same relative care. They are forged of special medium carbon steel, heat treated for maximum toughness. The heads are milled accurately to size. With each bolt is furnished an O. K. nut of special design, in which nut and washer are incorporated into one unit. Having nut and washer integral eliminates time which is often wasted trying to keep tabs on separate washers. This flanged nut is made of the same tough steel as the bolt itself.

"O. K." Tee Slot Bolts may be obtained in any length, from 2" long to 24". A circular completely describing and pricing the line will be sent you on request.

THE O. K. TOOL CO.,
Shelton, Conn.



Remove Broken Taps!

**Easily—
Quickly—
Without Injury
To the Threads**



The Walton Tap Extractor is a device for removing taps broken at or below the surface of the work — easily — quickly — and without injury to the threads.

Made in 2, 3, and 4 fluted styles in all standard sizes from No. 4 to 1½ inch.

Let us prove its value to you by a 60-day free trial.

Send for circular No. 120

THE WALTON COMPANY
101 Allyn Street HARTFORD, CONN.

Millions for Re-Tooling

(Continued from Page 11)

be brought together so that members of the Society could learn at first hand what new developments were available — prior to the peak buying season.

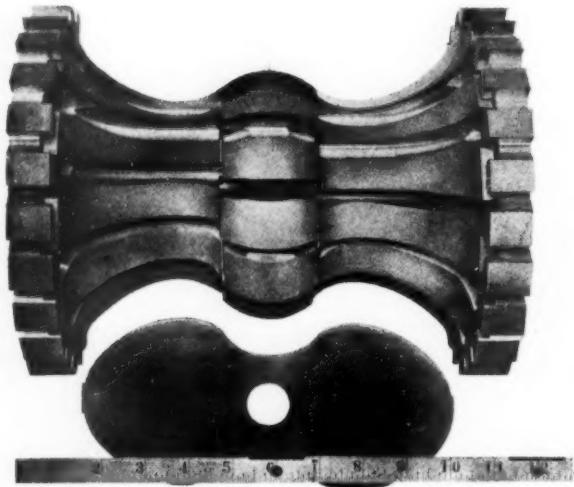
In announcing the show and annual convention, Frank A. Shuler, Master Mechanic, Chrysler Corporation and President of the A.S.T.E., said:

"Many millions of dollars will be spent by our members during 1938, toward the end of improving both ability to produce and products themselves. We believe that through interchange of technical information such as the A.S.T.E. now provides for production men, a better direction of spending efforts will be possible. In this connection we feel that the machine, tool, and equipment show, scheduled for March will be a major help in bringing to our members' attention valuable aids for solving their own problems."

The national convention will be under the direction of the executive committee, composed of Mr. Shuler, Luke E. Beach, Assistant Master Mechanic of Packard, Walter F. Wagner, Lincoln, Master Mechanic, C. R. Brunner, Tool Engineer, Dodge Brothers, Frank R. Crone of Lincoln, and Ford R. Lamb, Executive Secretary of the A.S.T.E.

James R. Weaver, chairman of the Pittsburgh Section and Director of Equipment, Westinghouse Electric and Mfg. Co., is in charge of the program, with J. A. Siegel, Packard Motor Car Co., in charge of entertainment.

**WHETHER THE MOST
COMPLICATED SPECIAL**



**OR THE SIMPLEST
STANDARD**



The same sound engineering principles are applied to all

**GODDARD & GODDARD
MILLING CUTTERS**

GODDARD & GODDARD CO. INC.

DETROIT, MICH.

SALVAGE YOUR TAPS WITH A D. & S. TAP GRINDER FIXTURE

Make Them Like New Again!

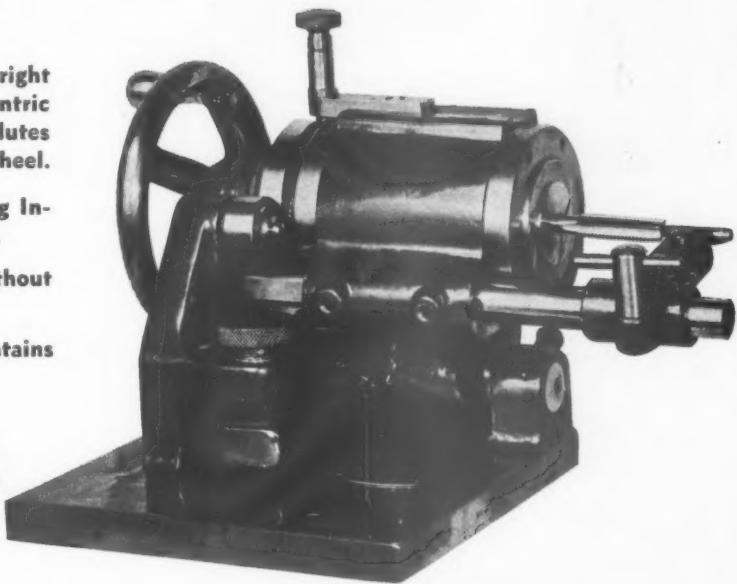
1st — Cutting Off

2nd — Repoint-2-3-4 Flute Taps; right or left hand with an eccentric relieved cam, pointing all flutes to one turn of the hand wheel.

3rd — Grinding in the Flutes, using Index Plate and Index Finger.

4th — Either on Center or Without Centers.

5th — Precision in Grinding Maintains Accuracy in Tapping.



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FOR COMPLETE SERVICE

*Think of the Advantages Gained by Securing
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Q-C Designed and Built Fixture and Drill Head
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Our Service and Standardized Products Include

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Dies, Jigs, Fixtures and Special Machinery

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Fixture Locks, Jigs and Fixtures, and Tooling
Thereof. Locating Pins and Rest Buttons. Live
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12 Sizes
From $\frac{3}{4}$ to 10 ton
Pressure



Plain and Swivel
Milling Machine Vises
4 Sizes
3 $\frac{1}{2}$ to 8 $\frac{1}{2}$ inch Jaws



Drill Press Vises
3 Sizes
4 $\frac{1}{2}$ -6 $\frac{1}{2}$ and 9 inch Jaws



Shaper Vises
2 Sizes
12 and 14 inch Jaws

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Catalog and
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3251 Cottage Grove Ave.

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If you need a
Set Screw
with
Guts
specify
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HOLLOW SET SCREW

Even under the severest punishment, "UNBRAKO" Hollow Set Screws hold fast and stay put. Made of alloy steel, properly heat-treated—they're tough and hard so points don't mushroom and hex won't round. Details on request.

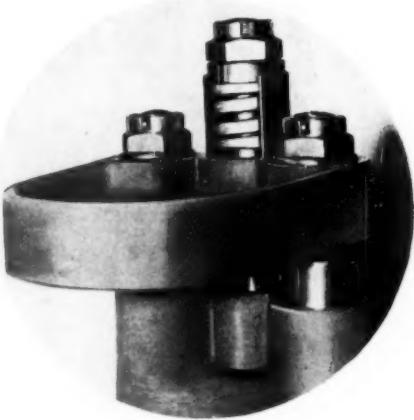
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THE SWARTZ LS TYPE FIXTURE

PROVIDES

SOLID CLAMPING PLUS INSURANCE
AGAINST PARTS LOOSENING UNDER
DRILL THRUST BY ACTION
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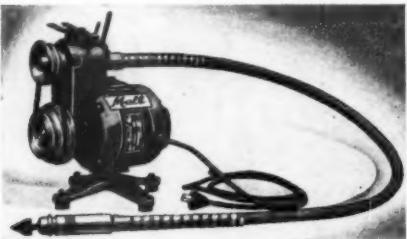
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Production Perspectives

(Continued from Page 42)

for 1937 at this plant is estimated to have totaled \$2,000,000, being the best year since 1930.

Addressing a Chamber of Commerce group recently, E. Payson Bullard, The Bullard Co., Bridgeport, reported that modern machinery is stimulating various industries throughout the South, and A. V. Bodine, Bodine Co., said that Midwestern manufacturers are placing more of their machinery orders in the East and in New England. Both men agreed that an upswing in industrial production is imminent. Leslie A. Hoffmann has been named works manager of J. L. Lucas & Sons, Inc., Bridgeport, which handles new and rebuilt machinery. . . . Landers, Frary & Clark has adopted the Westinghouse plan, providing for monthly conferences with employees, in its New Britain and New Hartford plants. . . . Ralph E. Day, president of Bridgeport Brass Co., Bridgeport, was guest of honor at a dinner January 12.

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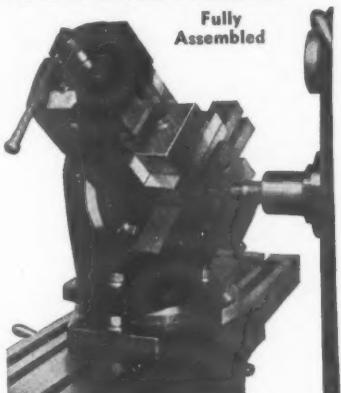
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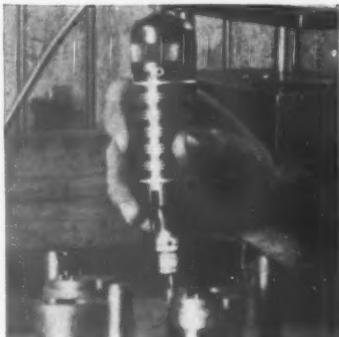
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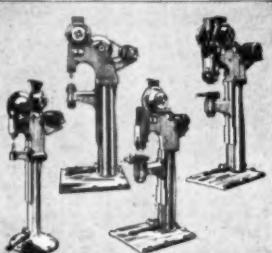
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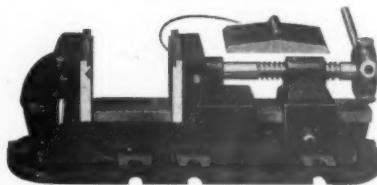
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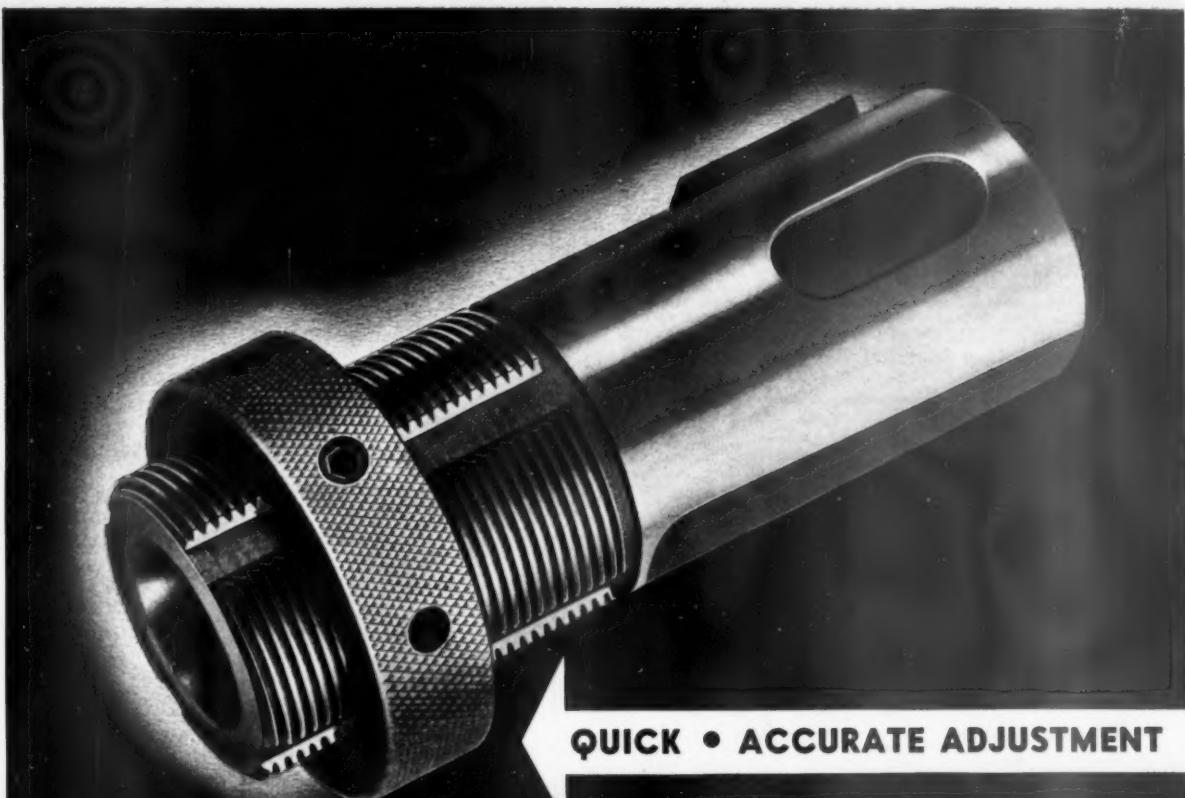
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